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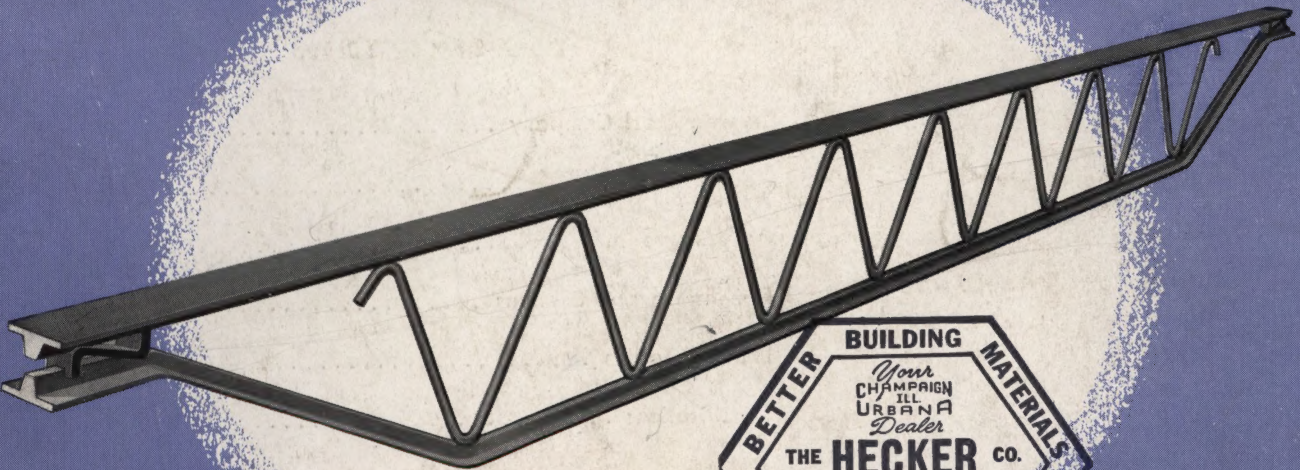

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TRUSCON OPEN TRUSS STEEL JOISTS

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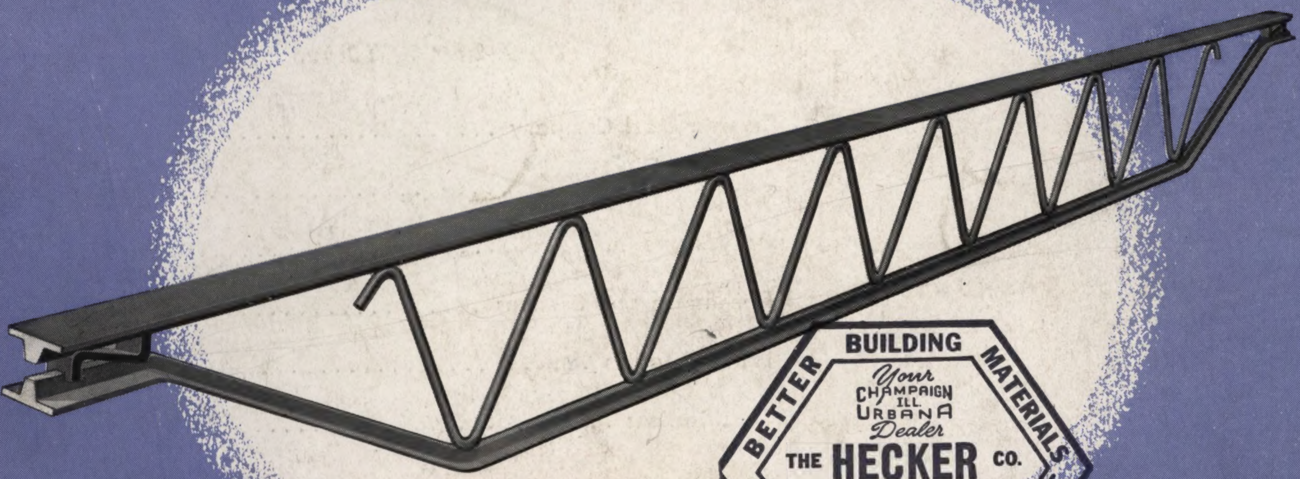

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TRUSCON
OPEN TRUSS STEEL JOISTS

TRUSCON

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No. E-170

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January, 1946

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A Complete Line of Building Products . . . Inside Back Cover
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TRUSCON STEEL COMPANY, YOUNGSTOWN 1, OHIO

Sales - Engineering Offices in Principal Cities

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

TRUSCON OPEN TRUSS

STEEL JOISTS

FOR FLOOR
CONSTRUCTION
AND AS PURLINS
FOR ROOF
CONSTRUCTION

TRUSCON
THE COMPANY BEHIND THE PRODUCT

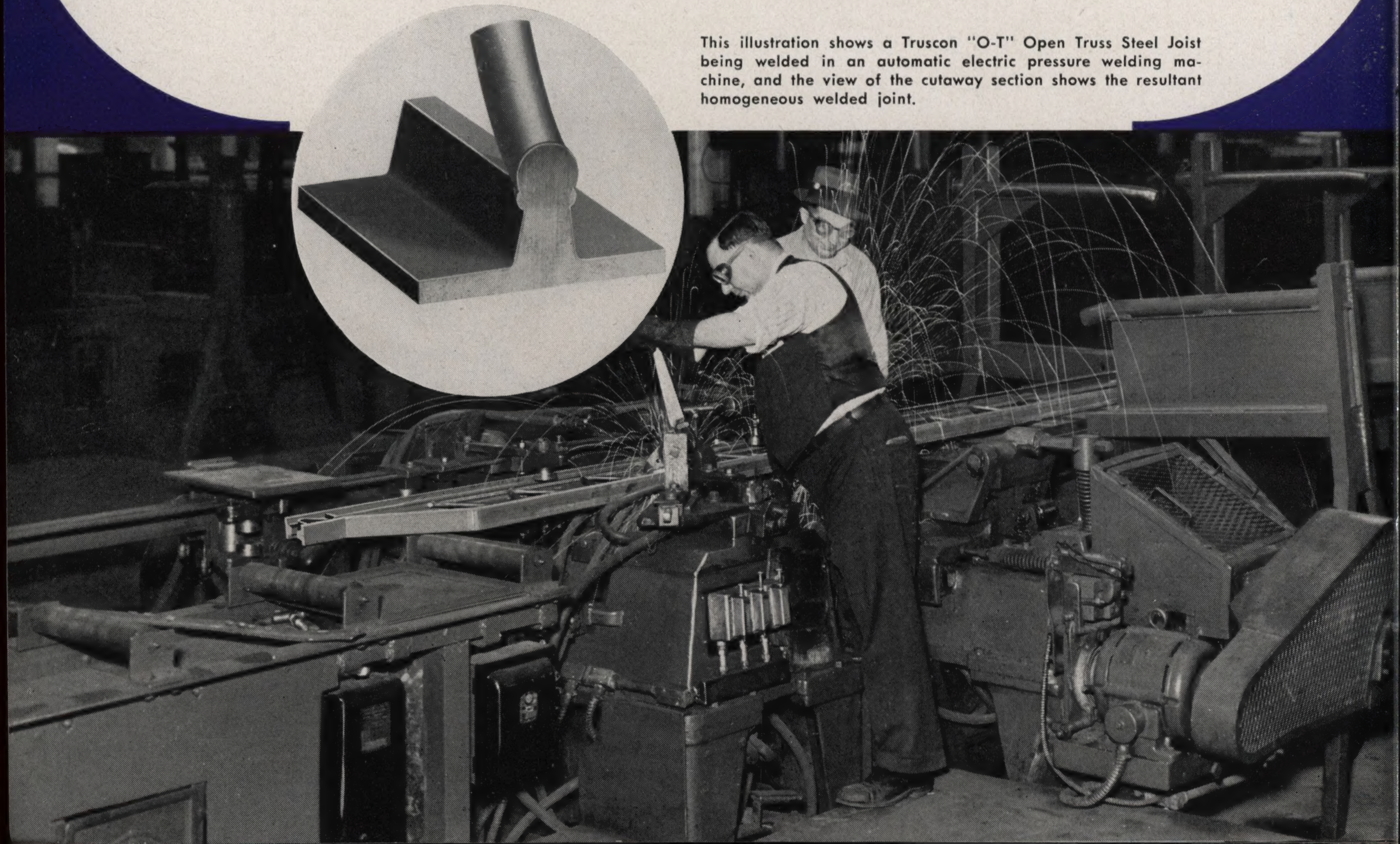
Truscon Steel Company represents over forty years' experience in the development and fabrication of steel building products and is the largest company of its kind in the world. Due to skilled personnel and efficient manufacturing facilities Truscon has gained a national reputation for the quality of its products and the dependability of its services.

Truscon engineers are ready to serve you with their technical knowledge backed up by a complete line of products which makes it possible for them to design in a most efficient and economical manner. Because we have operated in every section of the United States and in almost every country in the world, we are able to give you the combined experience from all of them.

Truscon products enter into every phase of building construction and include such noteworthy units as: Steel Windows and Mechanical Operators for every type of building, Steel Doors for industrial buildings and airplane hangars, Open Truss and Clerespan Joists, Metal Lath and Accessories, Concrete Reinforcing Steel, Steeldeck Roofs, Structural Steel and Light Steel Framing. Thus this association with all building requirements places us in an enviable position to assist architects, engineers and contractors.

Typical of the developments of Truscon's research is the resistance weld used in the manufacture of Open Truss Steel Joists. Tests were made to determine the proper voltage and amperage that should be used with each different combination of chord and web members. The proper pressure to be applied and the length of time the current should pass through the metals had also to be developed as well as determining the psychological moment at which the pressure should be applied. All of these factors are accounted for, and the results give uniform connections and homogeneous joints of exceptional strength.

To every problem which you lay before us, Truscon brings the authority of years of pioneering and leadership in the development of new methods of permanent construction and the new products which these methods require.



This illustration shows a Truscon "O-T" Open Truss Steel Joist being welded in an automatic electric pressure welding machine, and the view of the cutaway section shows the resultant homogeneous welded joint.

Truscon Open Truss Steel Joists are adaptable to all types of building construction

While Open Truss Steel Joists were primarily developed to provide a more rigid, fire resistant, economical and light weight floor construction, their use through the past years has proved their dependability in every type of construction. These joists are designed according to the best engineering practice and offer many distinctive advantages.

Fundamentally, the Truscon "O-T" Open Truss Steel Joist is a Warren truss having top and bottom chords of wide tee-shaped members and a plain round continuous web member. The bottom chord is continuous from end to end of joist and bent up at the ends to form the bearings. Steel joists are fabricated by means of electric machine welding under pressure, making positive connections at all joints.

The underslung design of the bearing permits maximum head-room under the supporting girders. The open web allows the passage of pipes and conduits in any direction.

In practical use, Truscon "O-T" Open Truss Steel Joists are very simple to install, being completely shop fabricated and reaching the job ready for placing. Each joist is marked to correspond with the erection diagram, thus greatly simplifying and speeding construction work.

OFFICE BUILDINGS

HOSPITALS

SCHOOLS

INDUSTRIAL AND COMMERCIAL BUILDINGS

APARTMENTS

Here are the advantages of TRUSCON "O-T" OPEN TRUSS STEEL JOIST CONSTRUCTION

VERMIN RESISTANT

All members of the Truscon "O-T" Open Truss Steel Joist are steel and impregnable to the attacks of insects.

ECONOMICAL

The economy of this construction occurs not only in the construction itself but in the savings that its light weight effects throughout the building in the supporting framework and foundations. Its speedy erection protects the original investment and minimizes the overhead expense. In the completed building, the permanence of Truscon "O-T" Open Truss Steel Joist Construction lowers insurance costs and maintenance expense.

ALL WEATHER BUILDING

Construction is carried on as readily in winter as in summer. Unlike many other systems of fireproof construction, Truscon "O-T" Open Truss Steel Joist Construction is not wholly dependent upon the setting of cement, which is seriously retarded by cold weather.

FIRE-RESISTANT

Fire tests prove that ¾" of cement or gypsum ceiling plaster protects Truscon "O-T" Open Truss Steel Joist Construction against high temperatures. The majority of insurance rating bureaus have recognized the merits of this construction and have accordingly given it a first-class fireproof classification.

Open Truss Steel Joist Construction is built entirely of incombustible materials. The reinforced concrete slab and metal lath ceiling are fire resistant materials and have proved their worth under the most severe conditions.

In every instance of actual fires occurring in buildings, Steel Joist Construction has amply justified every claim for its fire resistance. It has not only withstood the heat, but prevented the spread of fire to other parts of the building.

SOUND RESISTANT

The only practical test of the sound-proofness of any type of construction is in the completed construction itself. The different densities of the materials comprising the construction, together with the dead air space, tend to destroy sound waves originating either below or above the construction. The greatly increased use of Truscon "O-T" Open Truss Steel Joist Construction in larger and more expensive types of buildings, and its acceptance by Architects and Engineers in all parts of the country prove that this construction fully meets the essentials of soundproofness.

PIPES AND CONDUIT

Easily Installed

The open web of the joists permits the passage of pipes and electric conduits, within the depth of the floor, thereby making such installations very economical.

RADIANT HEATING

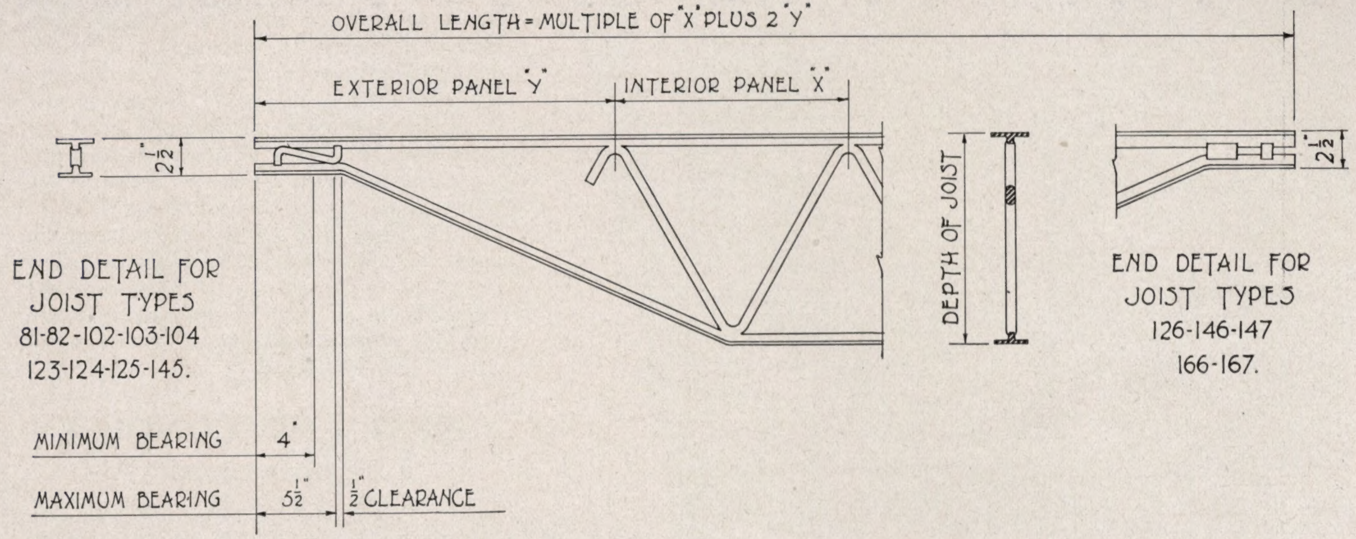
The open web of these joists will permit unobstructed flow of air current in any direction, and this feature is of important consideration when planning a radiant heating system.

LIGHT-WEIGHT

Easily Installed

Another feature of Open Truss Steel Joist Construction that recommends its use in many buildings is its light weight and speed of erection. The complete shop fabrication, the absence of form work and the minimum of field work—all contribute to make steel joists the most rapidly erected fire resistant construction. Being self-sustaining, any number of floors can be constructed at one time. The joists can be used as a working platform to carry on other building operations.

TRUSCON "O-T" STEEL JOIST DIMENSIONS AND SECTIONS

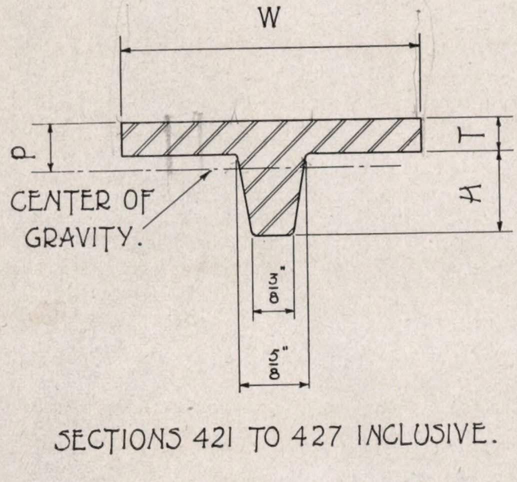

OVERALL LENGTH = MULTIPLE OF "X" PLUS 2 "Y"
EXTERIOR PANEL "Y"
INTERIOR PANEL "X"
2½"
END DETAIL FOR JOIST TYPES 81-82-102-103-104 123-124-125-145.
DEPTH OF JOIST
2½"
END DETAIL FOR JOIST TYPES 126-146-147 166-167.
MINIMUM BEARING
4"
MAXIMUM BEARING
5½"
½" CLEARANCE

JOIST TYPE	NOMINAL JOIST DEPTH Inches	TOP CHORD SECTION Number	BOTTOM CHORD SECTION Number	WEB PLAIN ROUND SECTION Dia. In.	INTERIOR PANEL DIMENSION "X" Inches	EXTERIOR PANEL LENGTHS ARE MADE IN THE FOLLOWING VARIABLE "Y" DIMENSIONS, AND WITH THESE SUFFIX LETTERS. A Ft.-In.	B Ft.-In.	C Ft.-In.	D Ft.-In.	E Ft.-In.	F Ft.-In.
81	8	421	421	⅜	9	1- 2½	1- 4	1- 5½			
82	8	422	421	7/16	9	1- 2½	1- 4	1- 5½			
102	10	422	421	7/16	11⅛	1- 4⅝	1- 6⅛	1- 7⅝	1- 9⅛		
103	10	423	422	7/16	11⅛	1- 4⅝	1- 6⅛	1- 7⅝	1- 9⅛		
104	10	424	423	½	11¼	1- 4¾	1- 6¼	1- 7¾	1- 9¼		
123	12	423	422	½	13⅝	1- 7⅛	1- 8⅝	1-10⅛	1-11⅝	2- 1⅛	
124	12	424	423	½	13⅝	1- 7⅛	1- 8⅝	1-10⅛	1-11⅝	2- 1⅛	
125	12	425	424	9/16	13⅜	1- 6⅞	1- 8⅜	1- 9⅞	1-11⅜	2- 0⅞	
126	12	426	425	9/16	13⅜	1- 6⅞	1- 8⅜	1- 9⅞	1-11⅜	2- 0⅞	
145	14	425	424	9/16	15¾	1- 9¼	1-10¾	2- 0¼	2- 1¾	2- 3¼	2- 4¾
146	14	426	425	9/16	15¾	1- 9¼	1-10¾	2- 0¼	2- 1¾	2- 3¼	2- 4¾
147	14	427	426	⅝	15¼	1- 8¾	1-10¼	1-11¾	2- 1¼	2- 2¾	
166	16	426	425	⅝	17⅞	1-11⅜	2- 0⅞	2- 2⅜	2- 3⅞	2- 5⅜	2- 6⅞
167	16	427	426	⅝	17⅞	1-11⅜	2- 0⅞	2- 2⅜	2- 3⅞	2- 5⅜	2- 6⅞

NOMENCLATURE: The complete nomenclature of a joist is determined by combining the "Joist Type," number of interior "X" panels, and the proper suffix letter to indicate the exterior panel "Y" length.

Example: 125-08C represents a joist type 125 with 8 interior panels and exterior panels of "C" length, making an over-all dimension of 12′-6¾″.

TRUSCON "O-T" STEEL JOIST CHORD SECTION PROPERTIES



SECTION NO.	W Inches	T Inches	H Inches	P Inches	AREA Sq. In.	ABOUT HORIZONTAL AXIS I In.⁴	r In.
421	1⅝	.125	⅜	.175	.391	.0078	.141
422	2¼	.129	⅜	.157	.478	.0089	.137
423	2¼	.143	½	.203	.572	.0184	.179
424	2¼	.203	½	.218	.707	.0243	.186
425	2½	.248	½	.226	.870	.0305	.187
426	2½	.258	¾	.303	1.020	.0738	.269
427	2¾	.3125	¾	.308	1.234	.0894	.269

A Member of the Steel Joist Institute

TRUSCON "O-T" STEEL JOIST LOADING TABLE

The designs of all Truscon "O-T" Open Truss Steel Joists have been checked and approved by the Steel Joist Institute as being in strict conformity with the Institute specifications.

The following table gives the TOTAL safe uniformly-distributed load-carrying capacities of Truscon "O-T" Open Truss Steel Joists at various spacings. The weight of DEAD loads must in all cases be deducted to determine the LIVE load-carrying capacities of the Joists.

TABLE ONE

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR VARIOUS JOIST SPACINGS																	
			12"	14"	16"	17"	18"	19"	20"	21"	22"	23"	24"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"	6'-0"	7'-0"
6'-0"	81	3200	530	457	400	376	356	337	320	305	291	278	267	213	178	153	134	106	89	76
7'-0"	81	2810	402	344	301	283	268	254	241	229	219	209	202	160	134	115	101	80	67	57
8'-0"	81	2460	308	264	231	217	205	194	184	176	168	160	154	123	103	88	77	61	51	44
	82	3800	475	407	356	335	316	300	285	271	259	248	238	190	158	136	119	95	79	68
9'-0"	81	2180	243	208	182	171	162	153	145	138	132	127	121	97	81	69	61	48	40	34
	82	3800	422	362	316	298	282	266	254	242	230	220	211	169	141	121	106	84	70	60
10'-0"	81	1970	197	169	148	139	131	125	118	113	108	103	99	79	66	57	50	39	33	28
	82	3500	350	300	263	247	233	221	210	200	191	183	175	140	117	100	88	70	58	50
	102	3800	380	326	285	268	253	240	228	217	207	198	190	152	127	109	95	76	63	54
	103	3900	390	334	292	275	260	246	234	223	213	203	195	156	130	112	98	78	65	56
	104	4400	440	377	330	312	293	278	264	252	240	230	220	176	147	126	110	88	73	63
11'-0"	81	1780	162	139	121	114	108	102	97	92	89	85	81	65	54	46	41	32	...	...
	82	3180	289	248	217	205	193	183	174	165	158	151	145	116	97	83	73	58	48	41
	102	3800	346	297	259	244	230	218	208	197	189	180	173	138	115	99	87	69	57	49
	103	3900	355	304	266	250	236	224	213	202	194	185	178	142	118	101	89	71	59	50
	104	4400	400	343	300	283	267	253	240	228	218	208	200	160	134	114	100	80	67	57
12'-0"	81	1635	137	117	102	96	91	86	82	78	74	71	68	55	46	39	34	28	...	...
	82	2920	243	208	183	172	162	154	146	139	133	127	122	98	81	70	61	49	40	35
	102	3500	292	250	219	206	194	184	175	167	159	152	146	117	97	84	73	58	48	42
	103	3900	325	279	244	230	217	205	195	186	177	170	163	130	109	93	82	65	54	46
	104	4400	367	314	275	259	244	232	220	210	200	191	183	147	122	105	92	73	61	52
	123	4400	367	314	275	259	244	232	220	210	200	191	183	147	122	105	92	73	61	52
	124	4600	384	329	288	271	256	242	230	219	209	200	192	153	128	110	96	76	64	55
	125	5000	417	358	312	294	278	263	250	238	228	218	208	167	139	119	104	83	69	59
	126	5400	450	386	338	318	300	284	270	257	246	235	225	180	150	129	113	90	75	64
13'-0"	81	1510	116	100	87	82	78	73	70	66	63	61	58	46	39	33	29	...	...	...
	82	2690	207	177	155	146	138	131	124	118	113	108	103	83	69	59	52	41	34	29
	102	3230	248	213	187	176	166	157	149	142	136	130	124	99	83	71	62	49	41	35
	103	3900	300	257	225	212	200	190	180	172	164	157	150	120	100	86	75	60	50	43
	104	4400	338	290	254	239	225	214	203	193	184	177	169	135	113	97	85	67	56	48
	123	4400	338	290	254	239	225	214	203	193	184	177	169	135	113	97	85	67	56	48
	124	4600	354	303	265	250	236	224	212	202	193	185	177	142	118	101	89	71	59	50
	125	5000	384	330	288	272	256	243	231	220	210	201	192	154	129	110	96	77	64	55
	126	5400	415	356	312	293	277	262	249	237	226	217	208	166	139	119	104	83	69	59
14'-0"	81	1400	100	86	75	71	67	63	60	57	55	52	50	40	34	29	...	...	...	...
	82	2500	178	153	134	126	119	113	107	102	98	93	89	71	60	51	45	35	30	...
	102	3000	214	184	161	152	143	135	129	123	117	112	107	86	72	62	54	43	36	31
	103	3900	278	239	209	197	186	176	167	159	152	145	139	111	93	80	70	55	46	40
	104	4400	314	270	236	222	210	199	189	180	172	164	157	126	105	90	79	63	52	45
	123	4380	313	268	235	221	209	198	188	179	171	163	156	125	105	90	78	62	52	45
	124	4600	328	282	246	232	219	208	197	188	179	171	164	131	110	94	82	65	55	47
	125	5000	357	306	268	252	238	226	214	204	195	187	179	143	119	102	90	71	59	51
	126	5400	386	331	289	272	257	244	232	220	210	201	193	154	129	110	97	77	64	55
	145	5800	414	355	311	292	276	262	248	237	226	216	207	166	138	119	104	83	69	59
	146	6200	443	380	332	313	296	280	266	253	242	231	222	177	148	127	111	88	74	63
	147	6800	486	416	364	343	324	307	292	278	265	254	243	194	162	139	122	97	81	69
15'-0"	81	1310	87	75	66	62	58	55	52	50	48	46	44	35	...	...	...	...	...	...
	82	2330	155	133	116	110	104	98	93	89	85	81	78	62	52	44	39	31	...	...
	102	2810	187	161	141	132	125	118	112	107	102	98	94	75	63	54	47	38	31	...
	103	3640	243	208	182	172	162	153	146	139	133	127	122	97	81	69	61	49	41	35
	104	4400	293	252	220	207	196	185	176	168	160	153	147	117	98	84	73	59	49	42
	123	4090	272	234	204	192	182	172	163	156	148	142	136	109	91	78	68	55	46	39
	124	4600	307	263	230	217	204	194	184	175	167	160	153	123	102	88	77	61	51	44
	125	5000	333	286	250	235	222	210	200	191	182	174	167	133	111	96	84	67	56	48
	126	5400	360	308	270	254	240	227	216	206	196	188	180	144	120	103	90	72	60	52
	145	5800	387	332	290	273	258	244	232	221	211	202	193	155	129	111	97	78	64	56
	146	6200	413	354	310	292	276	261	248	236	225	216	207	165	138	118	104	83	69	59
	147	6800	454	389	340	320	302	286	272	259	248	237	227	181	151	130	114	91	75	65

In "Steel Joist Construction" for floors, the joists should not be spaced more than 24 inches on centers, as indicated by figures to the left of heavy line in above table.

A Member of the Steel Joist Institute

TRUSCON "O-T" STEEL JOIST LOADING TABLE

TABLE ONE (Continued)

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR VARIOUS JOIST SPACINGS																
			12"	14"	16"	17"	18"	19"	20"	21"	22"	23"	24"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"	6'-0"	7'-0"
16'-0"	81	1230	77	66	58	54	51	49	46	44	42	40	38	31	...	...	...	...	...	...
	82	2190	137	117	103	97	91	86	82	78	75	71	68	55	46	39	34	...	...	...
	102	2630	164	141	123	116	110	104	99	94	90	86	82	66	55	47	41	33	...	...
	103	3420	213	182	160	150	142	134	128	122	116	111	106	85	71	61	53	43	35	30
	104	4170	260	223	195	184	173	164	156	149	142	136	130	104	87	74	65	52	43	37
	123	3840	240	206	180	170	160	152	144	137	131	125	120	96	80	69	60	48	40	34
	124	4600	287	246	216	203	192	182	172	164	157	150	144	115	96	82	72	58	48	41
	125	5000	312	268	234	221	208	197	187	178	170	163	156	125	104	89	78	63	52	44
	126	5400	337	289	253	238	225	213	202	193	184	176	169	135	113	97	85	68	57	48
	145	5800	363	311	272	256	242	229	218	208	198	189	182	145	121	104	91	73	61	52
	146	6200	387	332	290	274	258	245	233	222	212	202	194	155	129	111	97	78	64	56
	147	6800	425	364	319	300	283	268	255	243	232	222	213	170	142	122	107	85	71	61
	166	6400	400	343	300	282	266	253	240	228	218	208	200	160	133	114	100	80	67	57
	167	7200	450	386	338	318	300	284	270	257	246	235	225	180	150	129	113	90	75	64
17'-0"	102	2470	145	125	109	103	97	92	87	83	79	76	73	58	48	42	36	29	...	...
	103	3220	189	162	142	134	126	120	114	108	103	99	95	76	63	54	47	38	32	...
	104	3920	230	197	173	162	153	145	138	132	126	120	115	92	77	66	58	46	38	33
	123	3610	212	182	159	150	142	134	127	121	116	111	106	85	71	61	53	43	35	30
	124	4510	265	227	199	187	177	168	159	152	145	139	133	106	88	76	66	53	44	38
	125	5000	294	252	220	208	196	186	177	168	161	154	147	118	98	84	74	59	49	42
	126	5400	318	272	238	224	212	201	191	182	173	166	159	127	106	91	80	64	53	45
	145	5800	342	292	256	241	228	215	205	195	186	178	171	137	114	98	86	69	57	49
	146	6200	365	313	273	258	243	230	219	209	199	191	183	146	122	105	92	73	61	52
	147	6800	400	343	300	282	267	253	240	229	219	209	200	160	134	115	100	80	67	57
	166	6400	376	323	282	266	251	238	226	215	205	197	188	151	126	108	94	76	63	54
	167	7200	424	363	318	299	283	268	255	242	231	221	212	170	142	121	106	85	71	60
18'-0"	102	2330	129	111	97	92	86	82	78	74	71	68	65	52	43	37	32	...	...	...
	103	3040	169	145	127	119	113	107	101	97	92	88	85	68	56	48	42	34	...	...
	104	3710	205	177	155	146	138	130	124	118	113	108	103	83	69	59	52	41	34	30
	123	3410	189	163	142	134	126	120	114	108	103	99	95	76	63	54	47	38	32	27
	124	4260	236	203	178	167	158	150	142	135	129	124	119	95	79	68	59	47	40	34
	125	5000	278	238	208	196	185	175	167	159	152	145	139	111	93	79	70	56	46	40
	126	5400	300	257	225	212	200	190	180	172	164	157	150	120	100	86	75	60	50	43
	145	5780	321	275	240	227	214	203	193	184	175	168	161	129	107	92	81	65	54	46
	146	6200	344	295	259	243	230	218	207	197	188	180	172	138	115	99	86	69	58	49
	147	6800	378	324	284	267	252	239	227	216	206	197	189	151	126	108	95	76	63	54
	166	6400	356	305	267	251	237	225	213	203	194	186	178	143	119	102	89	72	60	51
	167	7200	400	343	300	282	267	253	240	229	219	209	200	160	134	115	100	80	67	57
19'-0"	102	2210	116	100	87	82	78	74	70	66	63	61	58	47	39	33	29	...	...	...
	103	2880	151	130	114	107	101	96	91	87	83	79	76	61	51	43	38	30	...	...
	104	3510	184	159	139	131	123	117	111	106	101	97	93	74	62	53	46	37	31	...
	123	3230	170	146	128	120	113	107	102	97	93	89	85	68	57	49	42	34	28	...
	124	4040	212	183	160	150	142	135	128	122	116	111	106	85	71	61	53	43	35	...
	125	4990	263	225	197	186	175	166	158	150	143	137	132	105	88	75	66	53	44	38
	126	5400	284	244	214	201	190	180	171	162	155	148	142	114	95	81	71	57	47	41
	145	5480	288	247	217	204	193	183	173	165	158	151	145	115	96	83	72	58	48	41
	146	6200	326	280	245	230	218	206	196	187	178	170	163	131	109	93	82	65	55	47
	147	6800	358	307	269	253	239	226	215	205	195	187	179	143	120	102	90	72	60	51
	166	6400	337	289	253	238	225	213	202	193	184	176	168	135	112	97	84	68	56	49
	167	7200	379	325	284	268	253	239	227	217	207	198	190	152	127	108	95	76	64	54
20'-0"	102	2100	105	90	79	74	70	66	63	60	57	55	53	42	35	30	...	...	...	...
	103	2730	137	117	102	96	91	86	82	78	75	71	68	55	46	39	34	...	...	...
	104	3340	167	143	125	118	111	105	100	95	91	87	84	67	56	48	42	33	...	...
	123	3060	153	131	115	108	102	97	92	88	84	80	77	61	51	44	38	31	...	...
	124	3830	192	164	144	135	128	121	115	109	104	100	96	77	64	55	48	38	32	...
	125	4740	237	203	178	168	158	150	142	135	129	124	119	95	79	68	59	47	40	34
	126	5400	270	232	203	191	180	171	162	154	148	141	135	108	90	77	68	54	45	39
	145	5200	260	223	195	184	174	164	156	149	142	136	130	104	87	74	65	52	43	37
	146	6200	310	266	232	219	207	196	186	177	169	162	155	124	103	89	78	62	52	44
	147	6800	340	292	255	240	227	215	204	195	186	178	170	136	113	97	85	68	56	49
	166	6400	320	275	240	226	213	202	192	183	175	167	160	128	106	92	80	64	53	46
	167	7200	360	309	270	254	240	228	216	206	197	188	180	144	120	103	90	72	60	52

In "Steel Joist Construction" for floors, the joists should not be spaced more than 24 inches on centers, as indicated by figures to the left of heavy line in above table.

TRUSCON "O-T" STEEL JOIST LOADING TABLE

TABLE ONE (Continued)

Clear Span	Joist Type	Total Safe Load Pounds	TOTAL SAFE LOADS IN POUNDS PER SQUARE FOOT FOR VARIOUS JOIST SPACINGS																	
			12"	14"	16"	17"	18"	19"	20"	21"	22"	23"	24"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"	6'-0"	7'-0"
21'-0"	123	2920	139	119	104	98	93	88	83	79	76	73	70	56	46	40	35	...	...	...
	124	3650	174	149	130	123	116	110	104	99	95	91	87	70	58	50	43	35	29	...
	125	4510	215	184	161	152	143	136	129	123	117	112	107	86	72	61	54	43	36	31
	126	5400	257	220	193	182	172	162	154	147	140	134	129	103	86	73	64	52	43	37
	145	4950	236	202	177	166	157	149	142	135	129	123	118	94	79	67	59	47	39	34
	146	6200	295	253	222	209	197	187	177	169	161	154	148	118	99	84	74	59	49	42
	147	6800	324	277	243	229	216	205	194	185	177	169	162	129	108	93	81	65	54	46
	166	6400	305	261	229	215	203	193	183	174	166	159	153	122	102	87	77	61	51	44
	167	7200	343	294	257	242	229	217	206	196	187	179	172	137	115	98	86	69	58	49
22'-0"	123	2790	127	109	95	90	85	80	76	73	69	66	63	51	42	36	32	...	...	...
	124	3480	158	136	119	112	105	100	95	91	86	83	79	63	53	45	40	32	...	...
	125	4300	196	168	147	138	130	124	117	112	107	102	98	78	65	56	49	39	32	...
	126	5300	241	207	181	170	161	152	145	138	132	126	121	97	80	69	60	48	40	34
	145	4730	215	185	162	152	144	136	129	123	117	112	108	86	72	61	54	43	36	31
	146	6200	282	242	212	199	188	178	169	161	154	147	141	111	94	80	70	56	47	40
	147	6800	309	265	232	218	206	195	185	177	168	161	154	123	103	88	77	62	52	44
	166	6400	291	250	218	206	194	184	175	166	159	152	146	116	97	83	73	58	48	42
	167	7200	327	280	245	231	218	206	196	187	178	171	164	131	109	93	82	65	54	47
23'-0"	123	2670	116	100	87	82	77	73	70	66	63	61	58	46	39	33	29	...	...	...
	124	3330	145	124	109	102	97	92	87	83	79	76	72	58	48	41	36	29	...	...
	125	4120	179	154	134	126	119	113	107	102	98	94	90	72	60	51	45	36	30	...
	126	5060	221	189	165	155	147	139	132	126	120	115	110	88	74	63	55	44	37	31
	145	4520	197	169	147	139	131	124	118	112	107	103	98	79	66	56	49	39	33	28
	146	5940	258	221	194	182	172	163	155	147	141	135	129	103	86	74	65	52	43	37
	147	6800	296	254	222	209	197	187	178	169	161	154	148	118	99	84	74	59	49	42
	166	6400	278	238	209	197	186	176	167	159	152	145	139	111	93	80	70	56	46	40
	167	7200	313	268	235	221	209	198	188	179	171	163	157	125	104	90	79	62	53	45
24'-0"	123	2550	106	91	80	75	71	67	64	61	58	55	53	42	35	30	...	...	...	...
	124	3190	133	114	100	94	89	84	80	76	73	69	67	53	44	38	33	...	...	...
	125	3950	164	141	124	116	110	104	99	94	90	86	82	66	55	47	41	33	...	...
	126	4860	202	174	152	143	135	128	121	116	110	105	101	81	68	58	51	41	34	...
	145	4340	180	155	135	127	120	114	108	103	99	94	90	72	60	52	45	36	30	...
	146	5690	237	203	178	168	158	150	142	135	129	124	119	95	79	68	59	47	40	34
	147	6800	283	242	212	200	189	179	170	162	155	148	142	113	94	81	71	57	47	41
	166	6400	267	228	200	188	178	168	160	152	145	139	133	107	89	76	67	53	44	38
	167	7200	300	257	225	212	200	190	180	171	164	157	150	120	100	85	75	60	50	43
25'-0"	145	4160	166	142	125	117	111	105	100	95	91	87	83	66	56	48	42	33	...	...
	146	5450	218	187	163	154	145	137	131	125	119	114	109	87	73	62	55	44	36	31
	147	6560	262	225	197	185	175	166	157	150	143	137	131	105	88	75	66	53	44	38
	166	6180	247	212	186	175	165	156	148	141	135	129	124	99	82	71	62	49	41	35
	167	7200	288	247	216	204	192	182	173	165	157	150	144	115	96	82	72	58	48	41
26'-0"	145	4000	154	132	115	108	102	97	92	88	84	80	77	61	51	44	38	31	...	...
	146	5250	202	173	152	143	135	128	121	115	110	105	101	81	67	58	51	40	34	...
	147	6300	243	208	182	171	162	153	146	138	132	127	121	97	81	69	61	49	41	35
	166	5950	229	196	172	162	153	145	137	131	125	119	115	92	76	65	57	46	38	33
	167	7200	277	237	208	196	184	175	166	158	151	145	139	111	92	79	69	55	46	40
27'-0"	145	3850	143	122	107	101	95	90	86	82	78	75	71	57	48	41	36	29	...	...
	146	5050	187	160	140	132	125	118	112	107	102	98	94	75	62	53	47	37	31	...
	147	6070	225	193	169	159	150	142	135	129	123	117	112	90	75	64	56	45	37	32
	166	5730	212	182	159	150	141	134	127	121	116	111	106	85	71	61	53	43	35	30
	167	6940	257	220	193	181	171	162	154	147	140	134	128	103	86	74	64	51	43	37
28'-0"	145	3720	133	114	100	94	89	84	80	76	72	69	66	53	44	38	33	...	...	...
	146	4880	174	149	131	123	116	110	105	100	95	91	87	70	58	50	44	35	29	...
	147	5850	209	179	157	147	139	132	125	120	114	109	105	84	70	60	52	42	35	30
	166	5520	197	169	148	139	131	124	118	113	107	103	99	79	66	56	49	39	33	28
	167	6690	239	205	179	169	159	151	143	137	130	125	119	96	80	68	60	48	40	34
29'-0"	166	5340	184	158	138	130	123	116	111	105	100	96	92	74	61	53	46	37	31	...
	167	6460	223	191	167	157	148	141	134	127	122	116	111	89	74	64	56	45	37	32
30'-0"	166	5150	172	147	129	121	114	109	103	98	94	90	86	69	57	49	43	34	...	...
	167	6240	208	178	156	147	139	131	125	119	113	108	104	83	69	59	52	42	35	30
31'-0"	166	4990	161	138	121	114	107	102	97	92	88	84	81	64	54	46	40	32	...	...
	167	6050	195	167	146	138	130	123	117	111	106	102	98	78	65	56	49	39	32	...
32'-0"	166	4840	151	130	113	107	101	96	91	86	82	79	76	60	50	43	38	30	...	...
	167	5860	183	157	137	129	122	116	110	105	100	96	92	73	61	52	46	37	31	...

In "Steel Joist Construction" for floors, the joists should not be spaced more than 24 inches on centers, as indicated by figures to the left of heavy line in above table.

A Member of the Steel Joist Institute

TRUSCON "O-T" STEEL JOIST SPECIFICATIONS

For Floor and Roof Construction

1. GENERAL.

Where "Steel Joist Construction" is specified, it shall be understood to mean that type of construction in which decks or top slabs are supported by Truscon "O-T" Steel Joists spaced not more than 24″ on centers in floors or 30″ on centers in roofs.

2. JOISTS.

Steel joists shall be made of hot rolled steel shapes in the form of a Warren truss having top and bottom chords of single tee-shaped members and a plain round continuous web member. The bottom chord shall be continuous from end to end of joist and bent up at the ends to form the bearings. Steel joists shall be fabricated by means of electric machine welding under pressure making positive connections at all joints.

All steel used shall conform to the American Society for Testing Materials Standard Specifications for Steel for Bridges and Builders Designation A-7 of latest adoption.

All steel joists shall be spray painted with one shop coat of asphalt base metal protective paint.

> *Note:—Years of study have convinced us that a shop coat of black asphalt base paint provides the most practical protective coating for Open-Truss Steel Joists. It must be remembered, however, that if joists are to be exposed in a building, without a protective ceiling attached, this paint will bleed through any second coat of paint that might be applied.*

3. DESIGN.

The design and details of all joists shall meet the requirements of the Steel Joist Institute Specifications.

4. LOCATION AND SPACING OF JOISTS.

Steel joists shall be spaced not more than 24 inches on centers in floors or 30 inches on centers in roofs, except they may be used to support roof-decks, if not spaced over seven feet on centers and provided the deck is securely attached to the top chords to prevent any lateral deflection.

There shall be one typical joist spaced not more than four inches in the clear from each end wall or bearing wall parallel to the joists. Structural steel tie beams shall not be used to take the place of joists unless architectural or structural plans indicate same are to be used as supporting members.

Where a partition is parallel to joists and the length of the partition exceeds fifty per cent of the joist span, one extra joist shall be provided under the partition or, if necessary, double joists shall be provided under the partition to safely support the additional partition load. Where partitions extend over joists at right angles to same, the additional partition load must be included in computations as part of the dead load.

5. ANCHORAGE.

The ends of steel joists shall extend a distance of at least four inches on concrete or masonry, and at least 2½ inches on structural steel supports. Ends of every third joist supported on concrete or masonry shall be anchored thereto with a ⅜-inch round wall anchor, and each end of every joist supported on structural steel shall be anchored thereto by means of a 3/16-inch round beam anchor or two welds each one inch long.

Steel joists parallel to walls shall have the top and bottom chords anchored to the wall where each row of bridging occurs.

6. SPAN.

The span of steel joists shall not exceed 24 times the depth of the steel portion of the steel joist.

(Continued)

7. BRIDGING

As soon as steel joists have been erected, bridging of an approved Steel Joist Institute type shall be installed between them before the application of construction loads. Bridging rows shall be spaced as follows:

Clear spans 0 to 14 feet—One bridging row
Clear spans 14 to 21 feet—Two bridging rows
Clear spans 21 to 32 feet—Three bridging rows

8. CEILINGS.

Where fire resistive construction is required, steel joists shall be protected on the underside with a fire resistive ceiling consisting of plaster on metal lath and shall have a reinforced concrete or gypsum top slab, all as is necessary to provide the required degree of fire resistance, provided that where wood joist construction is permitted steel joists may have a wood nailing strip attached to the top chord and a wood floor may be used, and provided further that where steel joists are used in places where unprotected wood joists are permitted no ceiling protection need be provided.

Where directly attached ceilings occur, ceiling extensions shall be provided at the ends of the steel joists.

Metal ceiling lath for directly attached ceilings shall be ⅜″ rib lath weighing 3.4 lbs. per square yard for joist spacings up to 30 inches. The rib lath shall be placed under the joists with the ribs up and at right angles to the joists. Ceiling lath shall be attached to the bottoms of the joists by means of lath clips spaced 8 inches apart, placed over the ribs of the lath.

9. DECKS OR TOP SLABS.

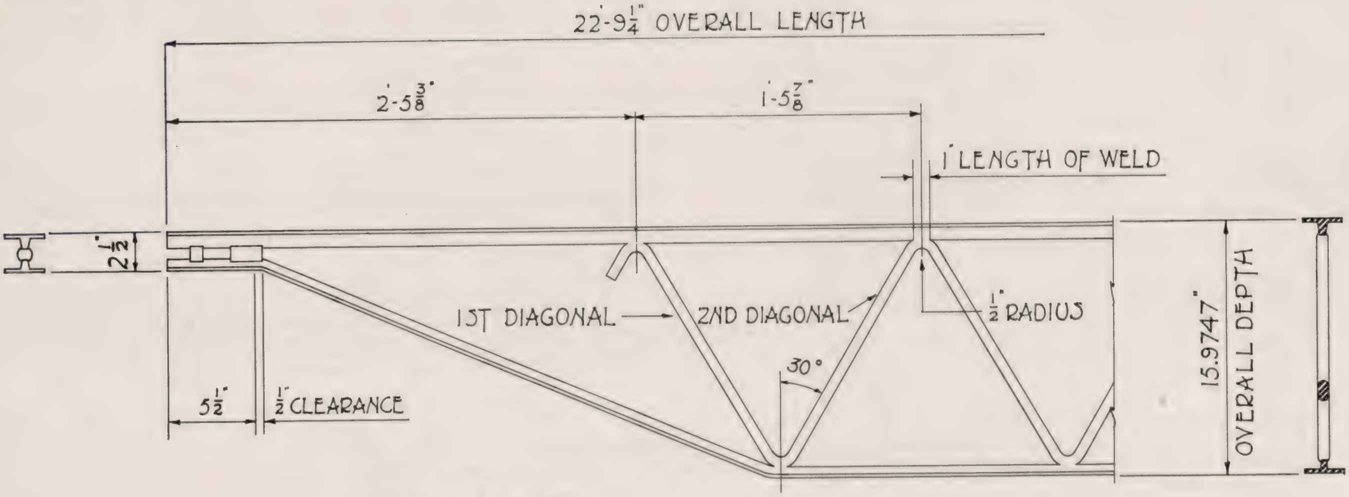
A concrete top slab 2 inches thick shall be used for floor and roof construction. The concrete top slab shall be reinforced and supported by ⅜″ rib lath weighing 4.0 lbs. per square yard for joist spacings up to 24 inches and ¾″ rib lath weighing .60 lbs. per square foot for joist spacings from 24 inches to 30 inches. The rib lath shall be placed over the joists with the ribs up and at right angles to the joists. Top lath shall be attached to the top of the joists by means of lath clips spaced 8 inches apart. The ends of all lath sheets shall be lapped at least 2 inches when the laps occur directly over joists and 4 inches when between joists. All laps shall be securely wired together. Where the floor finish is other than wood, the structural slab shall be reinforced against temperature stresses with 6x6 10/10 welded wire reinforcement placed near the top of the slab.

Precast concrete top slabs, precast gypsum top slabs, wood decks, or steel decks may be used over steel joists provided they are securely attached to the top chords to prevent any lateral deflection.

> *Note:—It is obviously impossible for Truscon to be responsible for differences in level between the tops of adjacent joists, whether due to slight inaccuracies which may occur in manufacturing or to the methods employed in installing the joists. Provision must be made by others, when necessary, to insure a uniform and level bearing for precast slabs placed over steel joists. This may be done by placing shims or some type of plastic material over the top flange of each joist where required.*

10. WOOD FLOORS.

Where wood floors are required over concrete top slab, screed clips shall be attached to the top chord of the joists to receive 2 inch by 3 inch (1⅝ inch by 2⅝ inch actual size) wood screeds. The screed clips shall raise the bottom of the wood screeds 1 inch above the joists.



JOIST TYPE 166-12E

Calculation of Allowable Stress in Top Chord:

Unsupported length = panel centers minus length of weld = 17⅞"—1" = 16⅞".

$$\text{Allowable stress} = f_s = \frac{18000}{1+\dfrac{l^2}{18000\ r^2}} = \frac{18000}{1+\dfrac{16.875^2}{18000\text{x}.269^2}} = 14771\ \#/\square''$$

Calculation of Resisting Moments of Chord Members:

Top Chord = 426 Section; Bottom Chord = 425 Section; Effective depth = distance between centers of gravity of top and bottom chords = 15.9747" — .303" — .226" = 15.4457".

R. M. of Top Chord = 1.020□" x 14771 x 15.4457" = 232,711 inch lbs.

R. M. of Bottom Chord = .870□" x 18000 x 15.4457" = 241,879 inch lbs.

R. M. required by Steel Joist Institute = 232,000 inch lbs.

The resisting moment of the top chord governs because it is less than the R.M. of the bottom chord.

Calculation of Safe Loads:

$$M = \frac{W\,l}{8};\quad W = \frac{8M}{L\text{x}12} = \frac{8\text{x}232{,}711}{L\text{x}12}$$

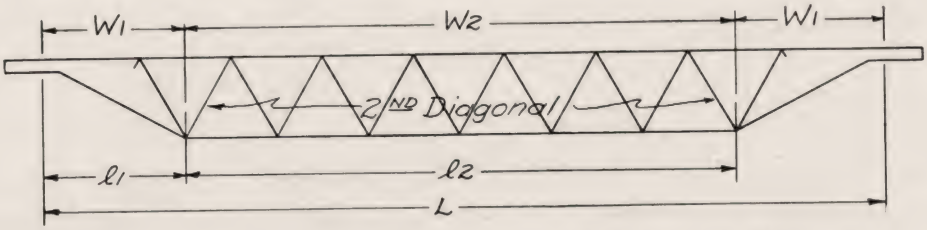
This value of W must not exceed twice the Max. End Reaction as calculated below.

Calculation of Allowable Stress in Web:

Web = ⅝" round; Unsupported length = 16$\frac{1}{16}$".

$$\text{Allowable stress} = f_s = \frac{18000}{1+\dfrac{16.0625^2}{18000\ \text{x}\ .156^2}} = 11{,}340\,\#/\square''$$

To Determine Maximum End Reaction:



Beginning at the center of the joist and considering the load sustained by each compression web member, we find that the 2nd diagonal from each end sustains all load from its base to the center of the joist and the remaining portion of the floor load is sustained by the end portion of the joist.

Therefore load W_2 equals twice the shear value of the 2nd diagonal.

This load W_2 divided by the distance l_2 gives the carrying capacity of the joist per lineal foot and, when multiplied by the clear span L, gives the total carrying capacity of the joist which is twice the end reaction.

TRUSCON "O-T" STEEL JOIST CALCULATIONS
(Continued)

Calculation of 2nd Diagonal Shear Value:

$V = fs \text{ x area x } \cos 30° = 11340 \text{ x } .3068 \text{ x } .866 = 3013\#.$

Calculation of Maximum End Reaction:

Assuming a clear span of 22′-0″ and a joist type 166, the complete nomenclature of the required joist would be 166-12E (22′-9¼″ over-all). The distance l_2 would be 11 x 1′-5⅞″ or 16′-4⅝″.

$$\frac{2 \text{ x } 3013 \text{ x } 22}{16'\text{-}4\tfrac{5}{8}''} = 8090\# \text{ or Max. End Reaction of } 4045\#.$$

Steel Joist Institute required end reaction = 3200#.

Preparation of Safe Load Tables:

From "Calculation of Safe Load," we obtain the value $W = \dfrac{8 \text{ x } 232{,}711}{L \text{ x } 12}$ but not to exceed 8090#

$$\frac{8 \text{ x } 232{,}711}{22 \text{ x } 12} = 7052\# \text{ safe load by resisting moment.}$$

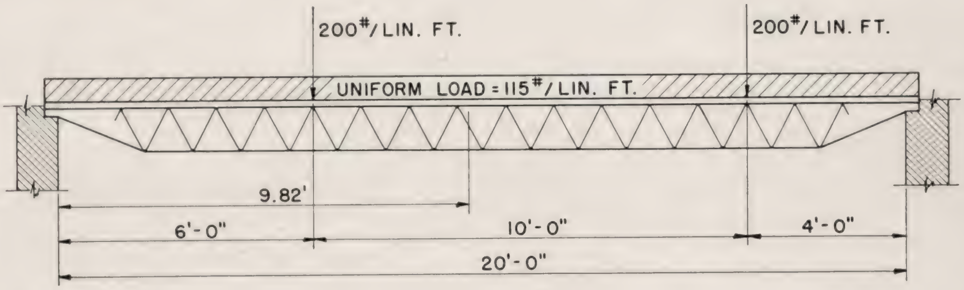
From the above calculation it is clearly evident that the Truscon "O-T" Open Truss Steel Joist exceeds the requirements of the Steel Joist Institute in every respect.

Truscon Steel Company, being a member company of the Steel Joist Institute, has designed all "O-T" Open Truss Steel Joists in accordance with the specifications of the Institute.

Method of Determining Uniform and Concentrated Load Moments:

First: Calculate loads and reactions on slab strip 1′-0″ wide.
Second: Determine point of maximum moment (Point of zero shear).
Third: Calculate moments.
Fourth: Calculate spacing of joists to satisfy maximum moment conditions.
Fifth: Check end reaction for joist spacing selected.

Live Load = 60
1½″ Finish = 18
2″ Con. Slab = 24
Joist = 3
Ceiling = 10
Total Load = 115#/□′
Partition Load = 200 lbs.
per foot of slab width.



(1) Reaction RL = 200 x 4 ÷ 20 = 40
200 x 14 ÷ 20 = 140
115 x 20 ÷ 2 = 1150
Total RL = 1330

Reaction RR = 200 x 6 ÷ 20 = 60
200 x 16 ÷ 20 = 160
115 x 20 ÷ 2 = 1150
Total RR = 1370

(2) Point Zero Shear (Point of Maximum Moment) = (1330# — 200#) ÷ 115#/′ = 9.82′

(3) Max. Mom. $= 1330\# \text{ x } 9.82' - 200 \text{ x } (9.82 - 6.0) - 115 \text{ x } \overline{9.82}^2 \div 2$
$= 13061 - 764 - 5545$
$= 6752'\#$
$= 81024''\#$

(4) Resisting Moment joist type 125 = 142000″#

Space joists type 125 @ $\dfrac{142000}{81024} = 1.75'$ o.c. or 21″ o.c.

(5) Maximum reaction of joist = 1370# x 1.75′ = 2400#
Allowable reaction = 2500#

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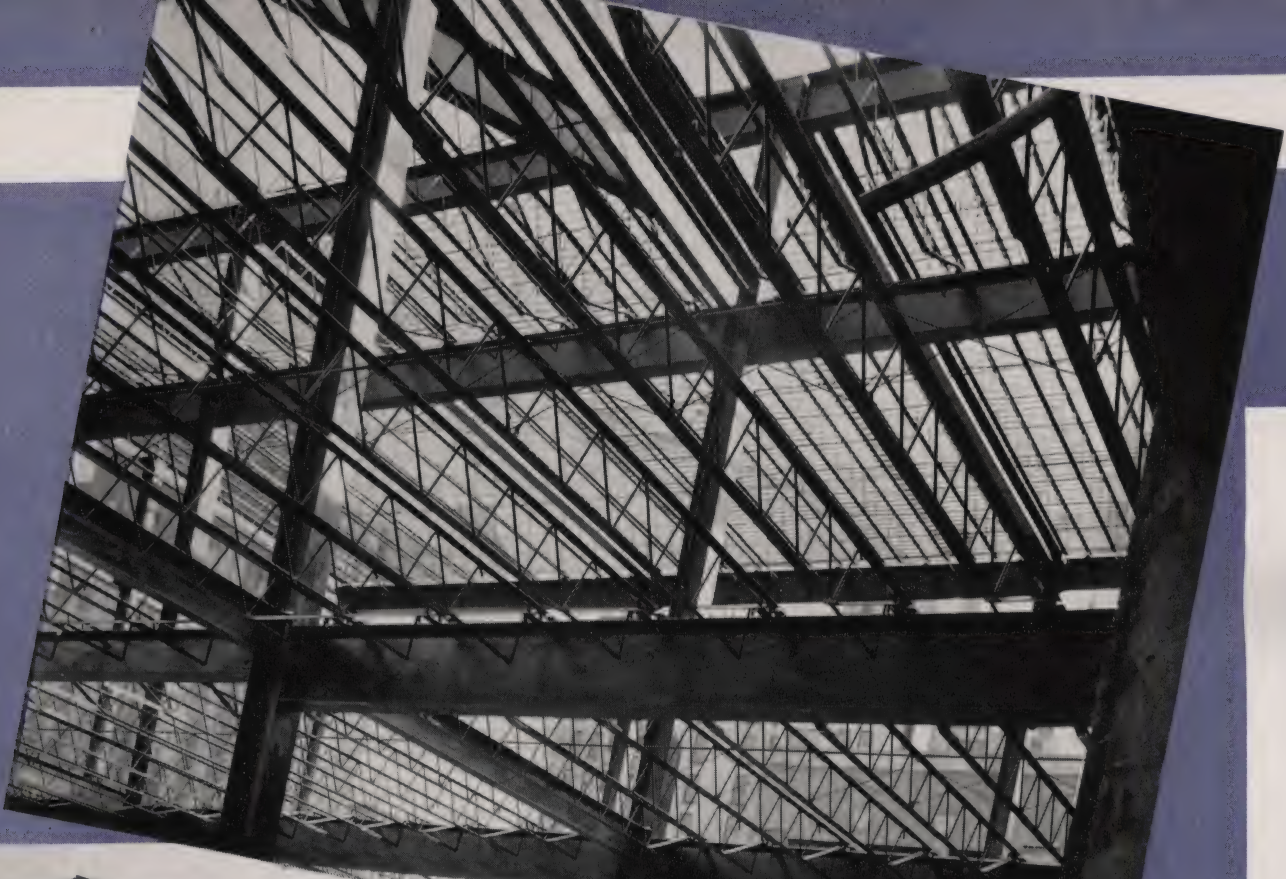

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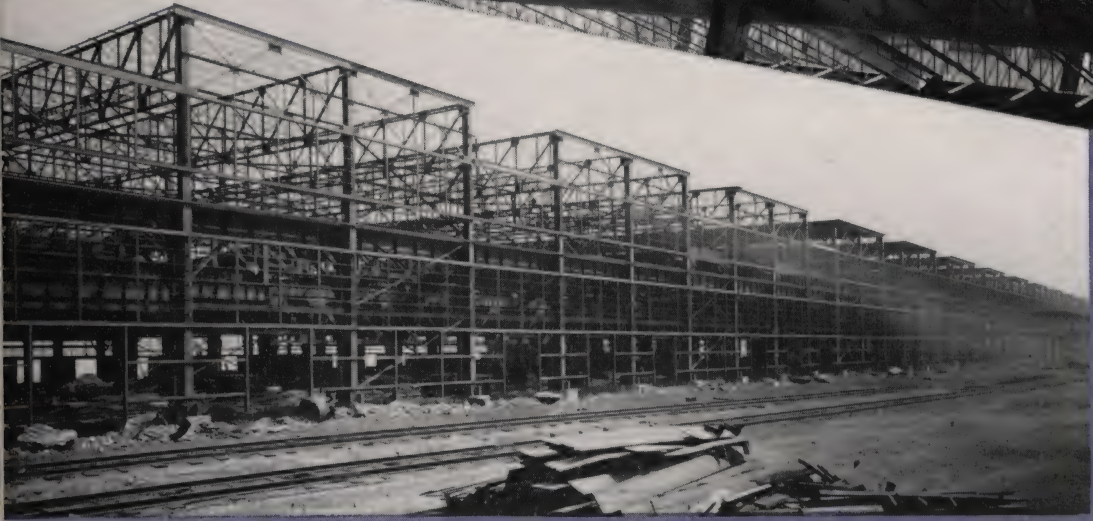
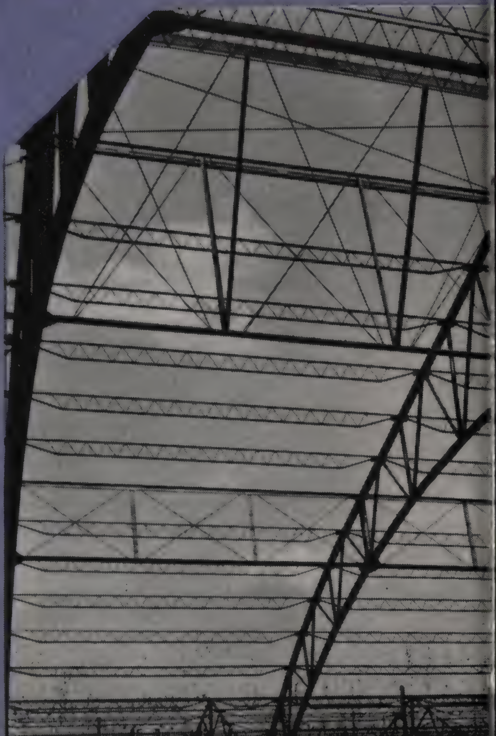
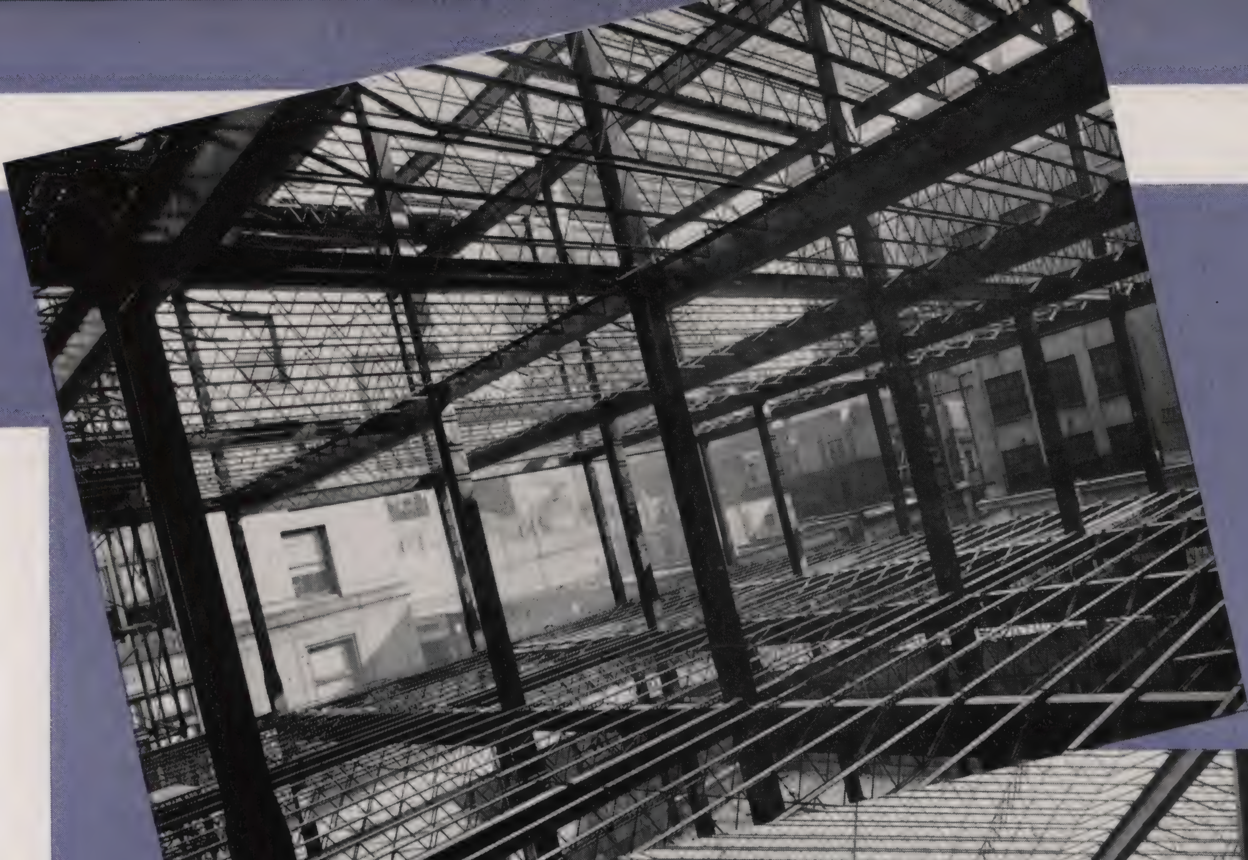
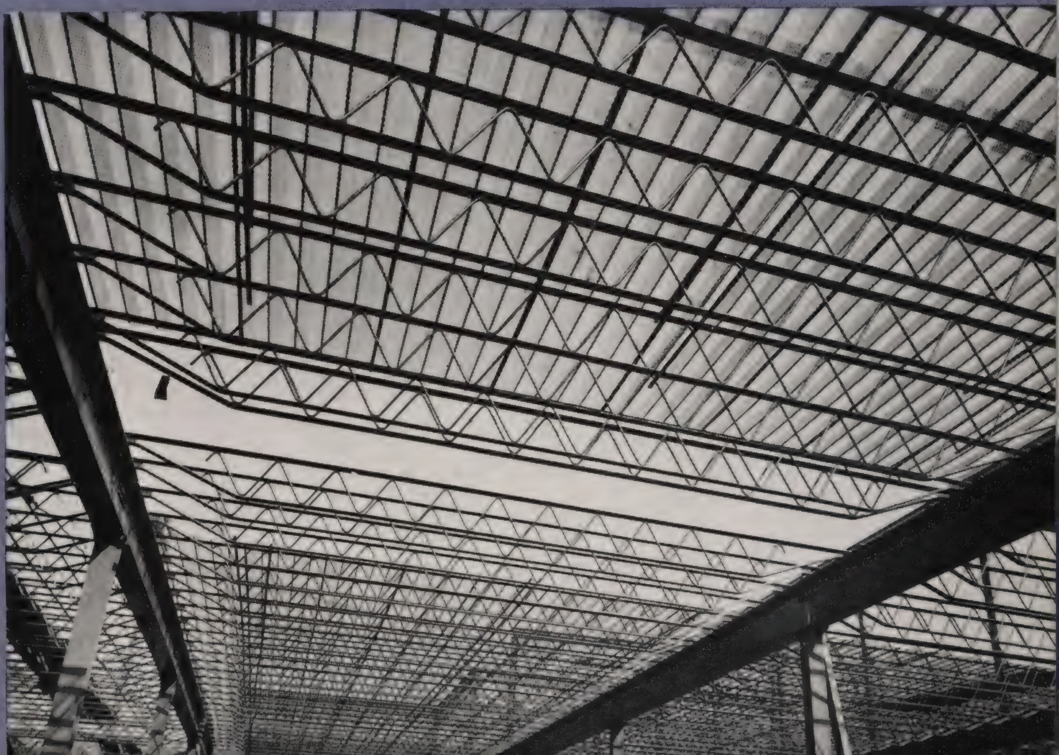




ICAL LATIONS OF SCON EN TRUSS JOISTS





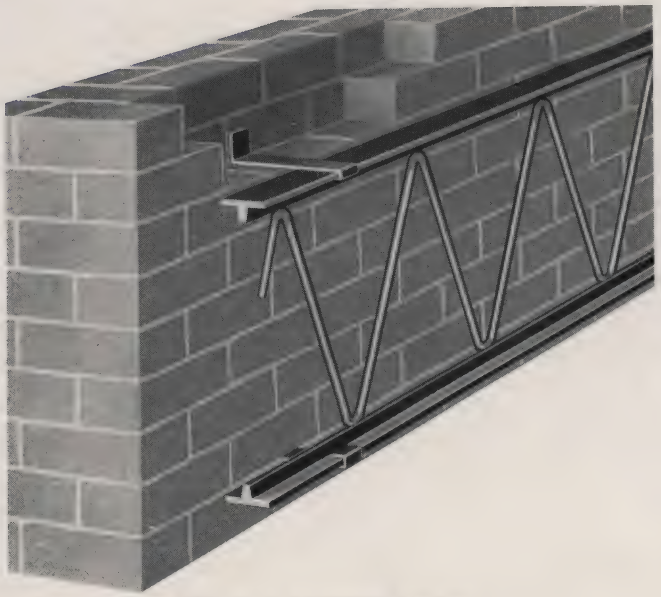
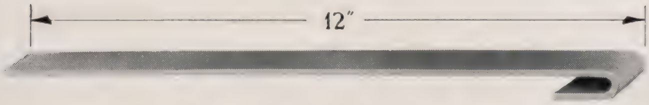


Fig. No. 1—Wall Anchor

WALL ANCHOR

P-3098



Steel Joists parallel to masonry walls should have their top and bottom chords anchored to the wall by means of wall anchors P-3098 where each row of bridging occurs. The bent end of the anchor should be first attached to the joist and the other end bent up and built into the masonry wall as shown in Figure No. 1.

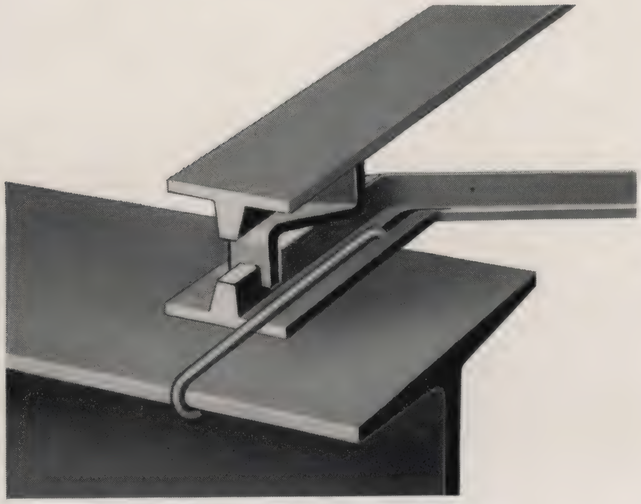
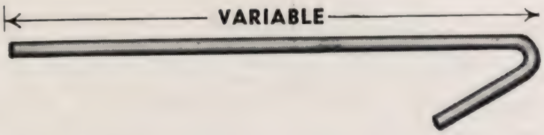


Fig. No. 2—Beam Anchor

BEAM ANCHOR

P-3099



Ends of all steel joists resting on structural steel beams should be anchored thereto by means of beam anchors P-3099. The bent end of the anchor should be first inserted in the slot that is provided in the bottom chord of the joist and the other end bent around the flange of the beam as shown in Fig. No. 2.

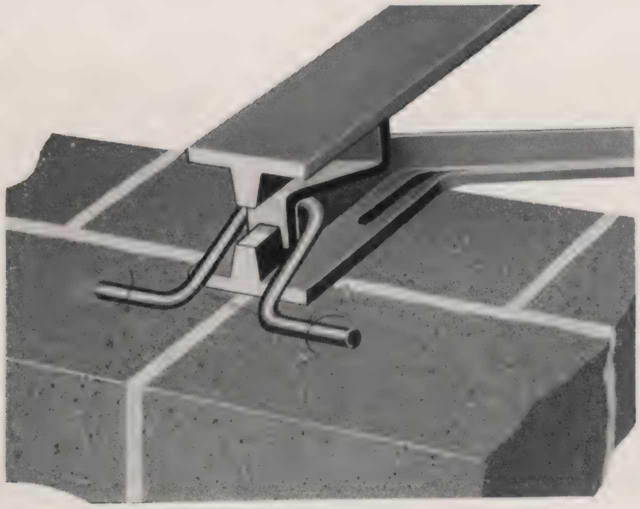
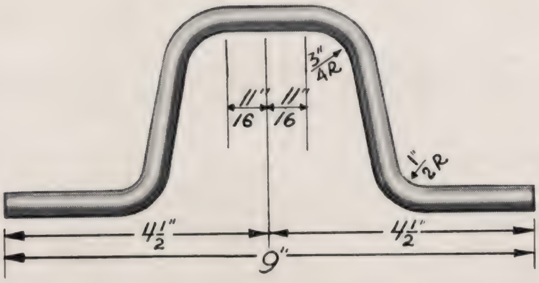


Fig. No. 3—Wall Anchor

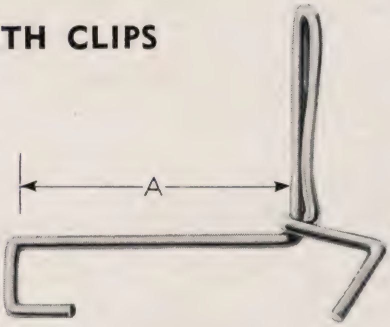
WALL ANCHOR

P-3101



Ends of every third joist resting on masonry walls should be anchored thereto by means of wall anchors P-3101 as shown in Figure No. 3.

LATH CLIPS



The clips used in attaching metal lath to Truscon "O-T" Open Truss Steel Joists are made of No. 13 gauge galvanized wire in dimensions as listed in the accompanying table.

The lath clips are easily attached without the aid of special tools, and should be spaced 8″ apart.

Figures No. 4 and 5 show the use of lath clips for attaching top lath. The lath clip is placed over the ribs of the metal lath, and attachment is completed by simply pressing the lever with the thumb.

Figures No. 6 and 7 show the method of attaching ceiling lath. Note that the lath clip crosses the rib of the metal lath.

Lath Clip	Dimen. A	For attaching lath to TOP chord of joists type	For attaching lath to BOTTOM chord of joists type
No. 1	1⅞″	81	81 82 102
No. 2	2⅜″	82 102 123 103 124 104	103 123 145 104 124 125
No. 3	$2\frac{11}{16}$″	125 145 166 126 146 167 147	126 146 166 147 167

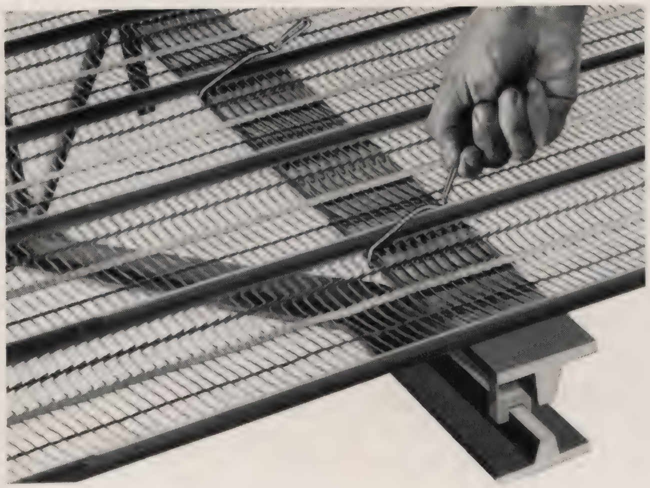


Fig. No. 4—Attaching Clip to Top Lath

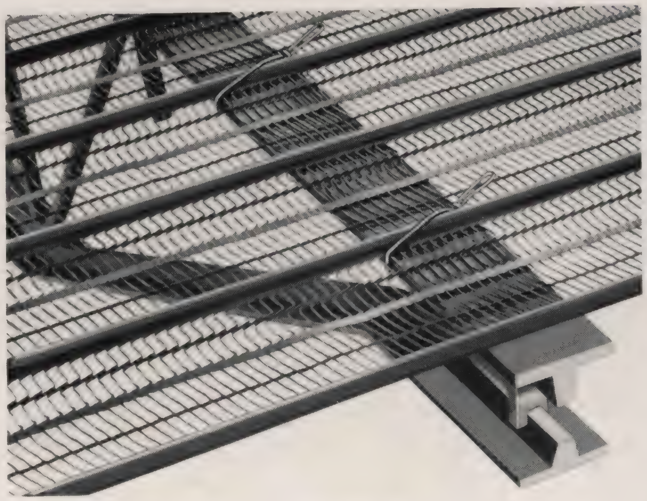


Fig. No. 5—Clips Hold Lath Firmly in Place

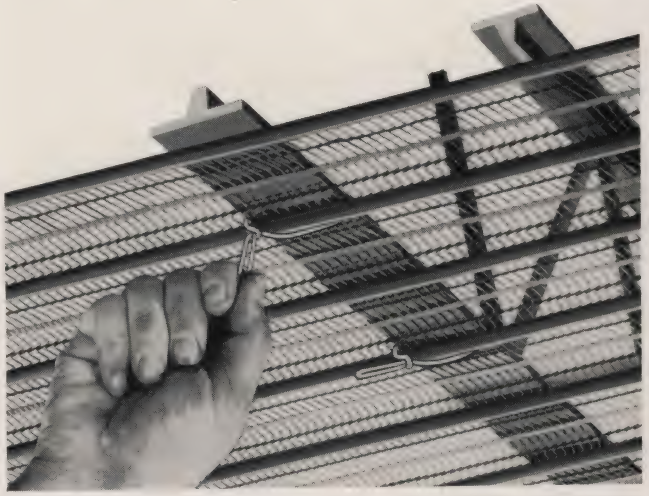


Fig. No. 6—Attaching Clip to Ceiling Lath

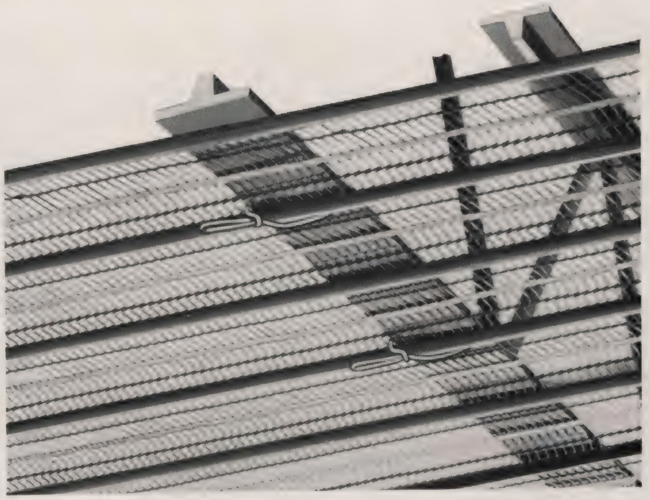


Fig. No. 7—Clips are Easily and Quickly Attached

SCREED CLIPS

P-3106

Where wood floors are required over concrete top slabs, screed clips must be used to elevate the wood screeds so that concrete can be properly worked under them. The screed clips must be attached to the top chord of the joists by means of lath clips.

These screed clips hold the bottom of the wood screeds one inch above the joists and are designed to hold nominally sized 2″ x 3″ (actual size approximately 1⅝″ x 2⅝″) wood screeds.

Where wood screeds are to be placed at right angles to the steel joists, screed clips P-3106 should be used as shown in Figure No. 8. Joists should then be spaced not more than 24″ on centers, and screed clips not more than 18″ on centers.

Where wood screeds are to be placed parallel to and directly over steel joists, screed clips P-3106 should be used as shown in Figure No. 9. Joists should then be spaced not more than 18″ on centers, and screed clips not more than 24″ on centers.

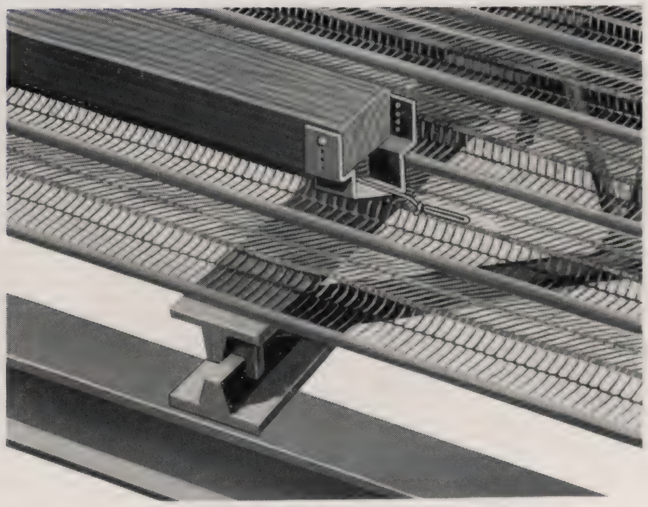


Fig. No. 8—Wood Screed at Right Angles to Steel Joist

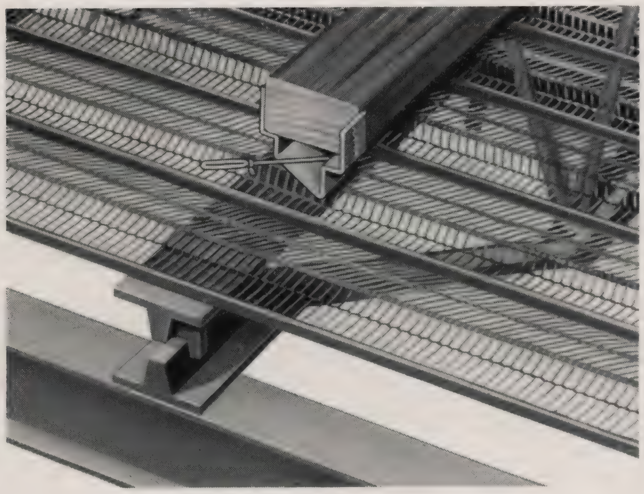


Fig. No. 9—Wood Screed Parallel to and Directly Over Steel Joist

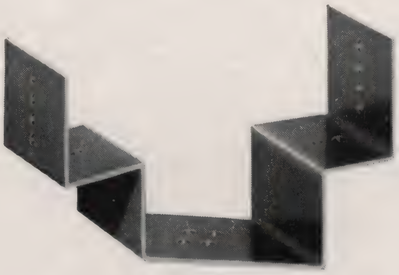


Fig. No. 10—Screed Clip P-3106

FURRING CLIP

P-3180

Where wood screeds at right angles to the steel joists are required on the under-side of the steel joists for ceiling construction, they can be attached by means of furring clips P-3180. These furring clips are made reversible to care for different thicknesses of wood screeds. Two clips are required at each intersection of screed and joist, and they should be attached on opposite sides of the screed as shown in Figure No. 11.

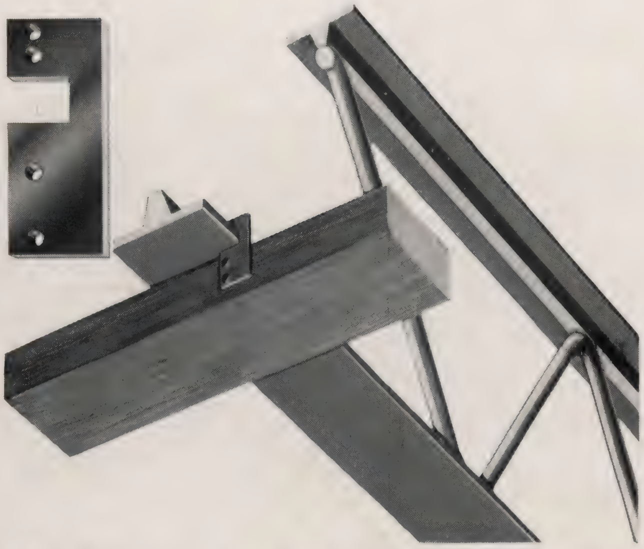
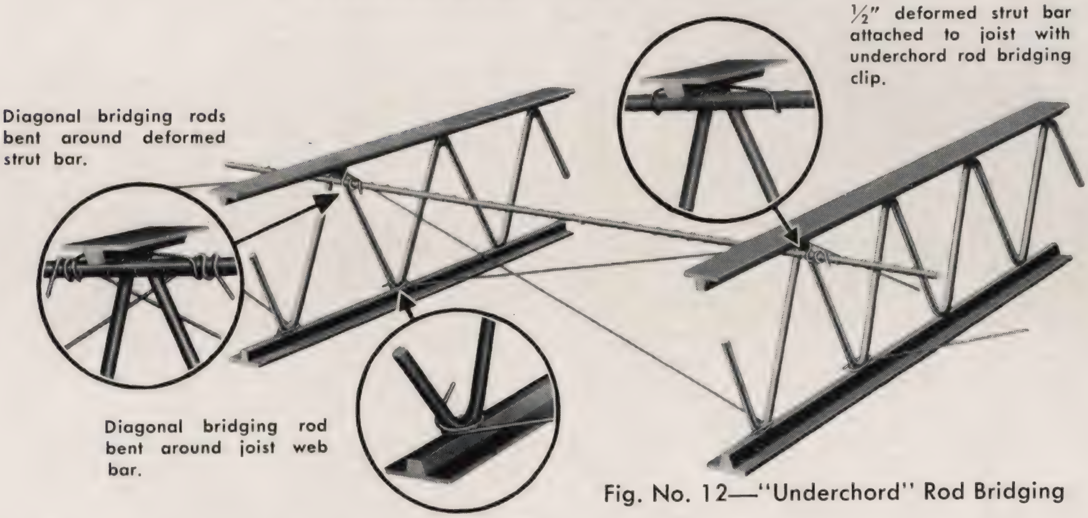


Fig. No. 11—Furring Clip for Attaching Wood Screed to Bottom Chord of Steel Joist

"UNDERCHORD" ROD BRIDGING



½" deformed strut bar attached to joist with underchord rod bridging clip.

Diagonal bridging rods bent around deformed strut bar.

Diagonal bridging rod bent around joist web bar.

Fig. No. 12—"Underchord" Rod Bridging

This type of bridging is very effective and is easily installed. It is very practical and will permit of a slight variation in joist spacings as is frequently necessary in order that joists can be spaced to avoid interference with bolt or rivet heads in supporting members, vent ducts, soil pipes, etc. The ½" deformed strut bars are first threaded through the joists and are held securely to the underside of the top chord of the joists by means of spring steel wire clips, P-3138. The diagonal bridging rods, P-3137, are then applied by placing the hooked ends as shown in Fig. A. The upper ends, being under the top chord and placed on the far side of the web bar, are then bent over the deformed strut bar as shown in Fig. B, and tightened by winding them around the deformed bar (by means of a bridging tool, P-3102) as shown in Figs. C, D and E. The lower hooked ends are then wound around the web members as shown in Figs. D and E.

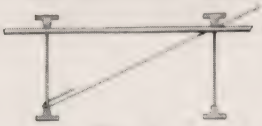


Fig. A

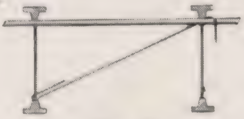


Fig. B

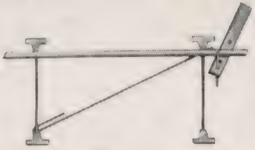


Fig. C

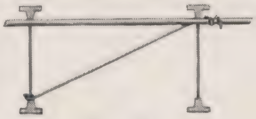


Fig. D

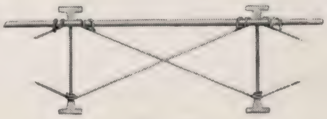


Fig. E

STRUT BRIDGING

For rigid and economical bridging that can be easily installed, this type has proved very popular. It is made of ¾" box channels and cut to lengths to meet the exact spacings of the joists. This strut bridging holds the joists in a vertical plane, assuring accurate spacing and distribution of loads by acting in both tension and compression as illustrated. This bridging does not permit of variations in spacing as does the "Underchord" Rod Bridging.

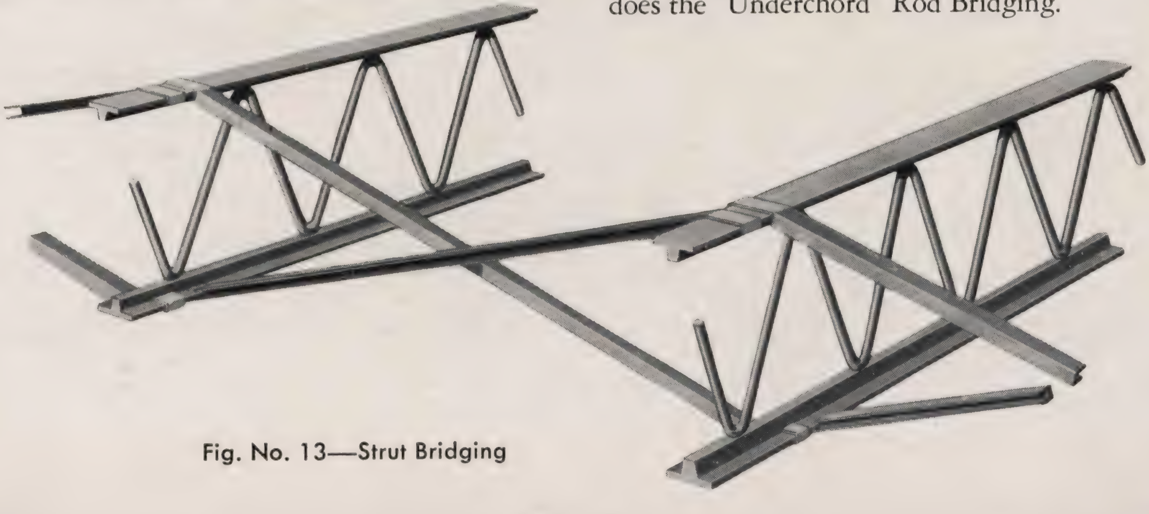


Fig. No. 13—Strut Bridging

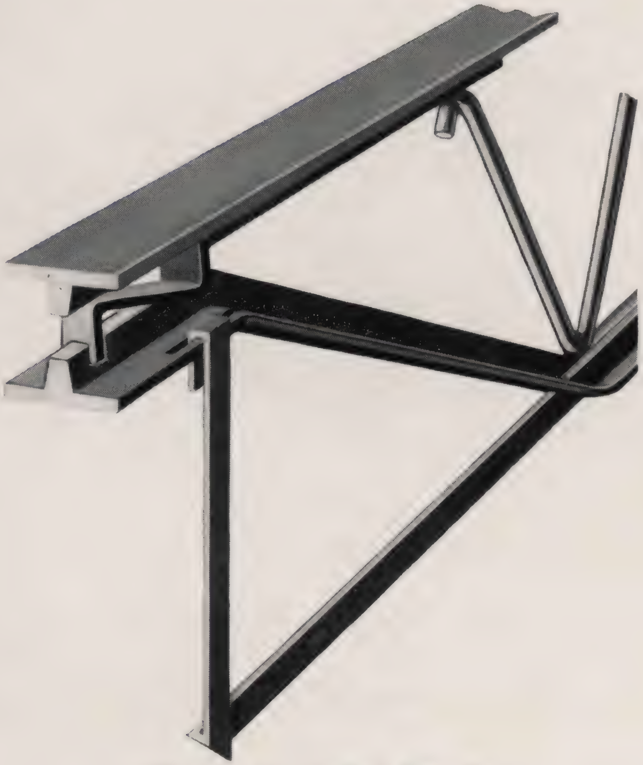


Fig. No. 14—Ceiling Extension

CEILING EXTENSION

P-3100

When plastered ceilings are to be attached directly to the joists, ceiling extensions of the proper size must be provided at the ends of joists. These ceiling extensions are readily applied after the joists have been completely installed, and also permit the installation of pipes of considerable lengths adjacent to the supporting wall or structural member without interference. Two slots are provided in each end of each joist (one at each bend) and the ceiling extension is slipped through the lower slot and hung in the upper one as shown in Figure No. 14.

HEADER

P-3193

Where small openings not over 4′-0″ are required in steel joist floor or roof construction, framing can be accomplished by means of a header P-3193. The tail joist is bolted to the top of the header as shown in Figure No. 15. We recommend that for openings greater than 4′-0″ the framing be accomplished by means of structural steel.

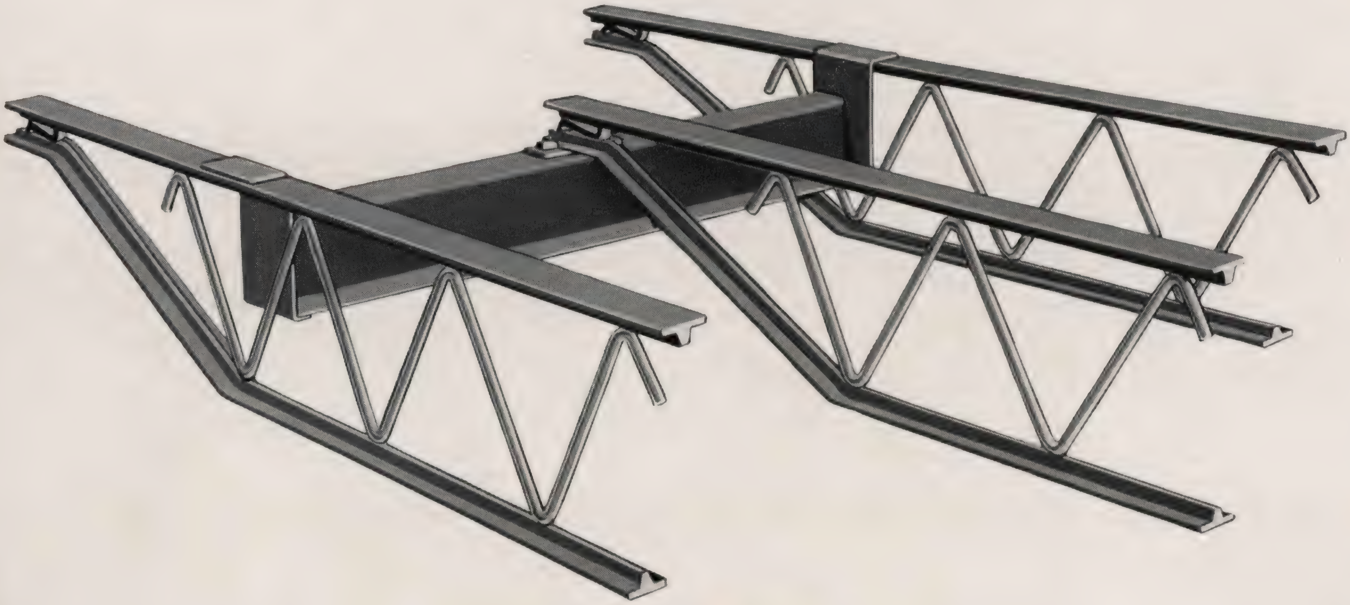


Fig. No. 15—Header Section

BOLTED CONNECTION

P-3194

Where steel joists are required to be bolted to a supporting structural steel member, attachment can be made by shop-welding plates to the ends of the joists. These plates are provided with two 13/16″ diameter bolt holes spaced 4 inches on center, and attachment of the plates under the ends of the joists can be so located as to meet the spacing of the holes in the supporting members as shown in Figure No. 16. Where bolted connections are provided, the overall depth of the joist end, including the bearing plate, amounts to 2¾″.

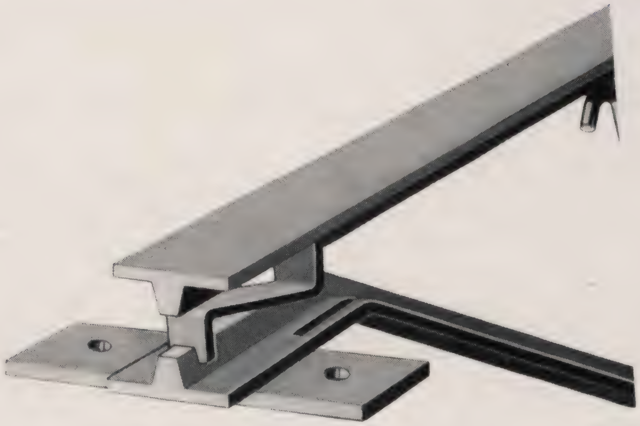


Fig. No. 16—Bolted Connection

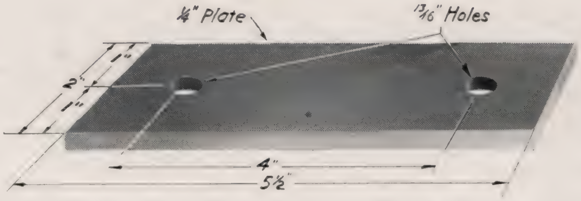


Fig. No. 17—Bearing Plate for Bolted Connection

SAG RODS

When Truscon "O-T" Open Truss Steel Joists are used as purlins on inclined roofs and are placed at right angles to the slope, sag rods generally are necessary, and these require sag rod plates attached to the joists. The plates are arc welded to the web members of the joists as illustrated in Figure No. 19.

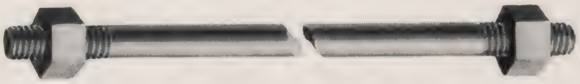


Fig. No. 18—Sag Rod

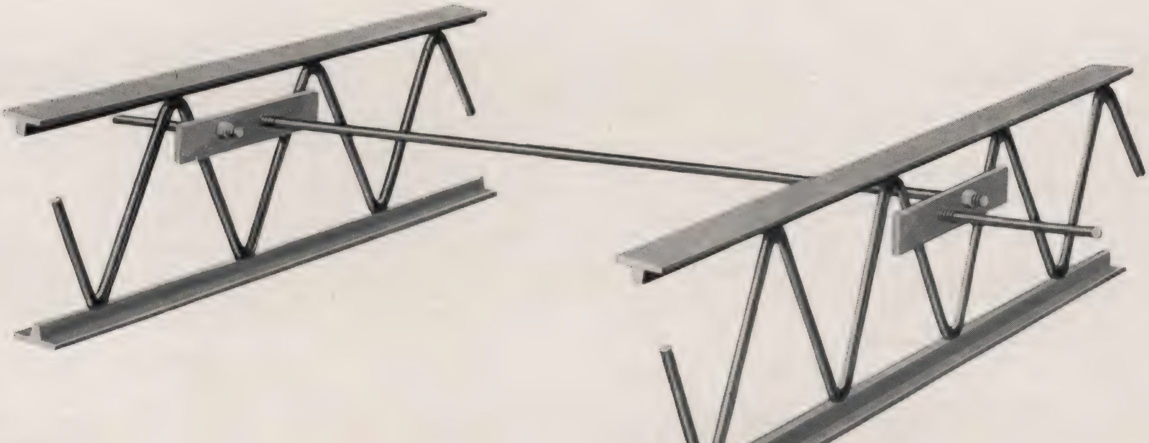


Fig. No. 19—Sag Rods Assure Correct Alignment

STEEL JOIST INSTITUTE SPECIFICATIONS

Compiled by FRANK BURTON, CONSULTING ENGINEER

Adopted by the Steel Joist Institute, December 20, 1928. Effective February 1, 1929. Revised December 12, 1933 and April 23, 1941.

Section 100. SCOPE:

(a) These specifications cover the use of "Steel Joist Construction" in any structure to be erected under the provisions of these specifications.

NOTE: When these Standard Specifications for Steel Joists are used in a building code as Building Regulations for Steel Joist Construction, in all instances where the word "specifications" appears in these Standard Specifications, the word "regulations" is to be substituted therefor, and Section 100, Paragraph (a), as given above is to be replaced with the following:

> "(a) These regulations cover the use of 'Steel Joist Construction' in any structure to be erected under the provisions of this building code, of which they form a part. They are intended to supplement the general provisions of this building code in order to provide for the proper design and erection of structures of this type of construction. In all matters pertaining to the design and erection of 'Steel Joist Construction' where these specific regulations may be in conflict with other provisions of the code, these regulations shall govern."

(b) "Steel Joist Construction" as governed by these specifications shall be that type of construction where decks or topslabs, as defined in Section 110 of these specifications, are supported by separate steel members herein referred to as "steel joists", spaced not farther apart than twenty-four (24″) inches on centers in floors and thirty (30″) inches on centers in roofs, but in no case spaced farther apart than the safe span of the top slab, deck, or flooring over said steel joists. Where such separate steel members are used at wider spacings than specified in this paragraph herein, the construction shall not be considered as "Steel Joist Construction" as defined in these specifications.

Section 101. DEFINITION OF STEEL JOIST:

Any steel member suitable for supporting floors and roofs between the main supporting girders, trusses, beams or walls when used as hereinafter specified shall be known as a "steel joist". Such steel joists may be made of hot or cold formed sections, strip, or sheet steel, riveted or welded together, or by expanding.

Section 102. MATERIALS:

(a) All steel used shall conform to the American Society for Testing Materials Standard Specifications for Steel for Bridges and Buildings Designation A7 of latest adoption.

(b) All steel joists shall receive one coat of asphalt base paint applied by dipping or spraying, or an equivalent protective covering, before leaving the shop.

STEEL JOIST INSTITUTE STANDARDS

Joist Type	Nominal Depth Inches	STEEL JOIST INSTITUTE STANDARDS				Average Weight per Foot of Joist Pounds
		Resisting Mom. Inch Pounds	Resisting Mom. Foot Pounds	Max. End Reaction Pounds	Section Modulus Inches^3	
81	8	29500	2458	1600	1.64	3.42
82	8	52500	4375	1900	2.92	4.00
102	10	63000	5250	1900	3.50	4.00
103	10	82000	6833	1950	4.56	4.68
104	10	100000	8333	2200	5.56	5.65
123	12	92000	7667	2200	5.11	5.00
124	12	115000	9583	2300	6.39	5.65
125	12	142000	11833	2500	7.89	6.80
126	12	175000	14583	2700	9.72	8.00
145	14	156000	13000	2900	8.67	6.92
146	14	205000	17083	3100	11.39	8.00
147	14	246000	20500	3400	13.67	9.55
166	16	232000	19333	3200	12.89	8.30
167	16	281000	23417	3600	15.61	9.60

Section 103. CONNECTIONS:

(a) The joints and connections of all steel joists shall be made by connecting the members directly to one another by fusion or resistance welds or by rivets. In the case of expanded steel joists, a portion of the metal may be left intact to form a connection. All joints and connections shall be capable of withstanding a load at least three (3) times the designed load and shall be sufficiently rugged to resist the stresses incident to handling and erection when handled in a reasonable manner. Members meeting at a joint shall have their lines of center of gravity meet at a point if practicable; if not, stresses arising from eccentricity shall be included with other stresses in designing the members. In no case shall the eccentricity of any intermediate joint exceed three-quarters (¾) of the least diameter of the largest member connected, but end members may be designed as projecting beams. Ends of steel joists shall be designed to resist the bending produced by eccentricity of the reaction at the support.

(b) In the case of nailer steel joists, wood nailer strips shall be firmly attached to the top chords or top flanges of the steel joists. Such nailer strips shall be of a good grade of wood at least 1½″x1½″ in net section. The attachments of the nailer strips shall, in conjunction with the top deck or slab, provide adequate lateral support to the top chords or top flanges of the steel joists.

Section 104. METHODS OF DESIGN AND STRESSES:

(a) An open web steel joist built up of bars or other sections, or one fabricated by expanding a rolled section, shall be designed as a truss. The compression stress in pounds per square inch in the top chord or diagonals shall not exceed 15,000 nor

$$\frac{18{,}000}{1+\dfrac{l^2}{18{,}000\,r^2}}$$

when the length "*l*" of the member is the distance clear of welds or other attachments and "r" is the corresponding least radius of gyration of the member or any component part thereof. The ratio of "*l*" to "r" shall not exceed 120. In the completed structure, the top chords of open web steel joists may be considered as being stayed laterally at panel points when the deck or top slab over the steel joists complies with the provisions of Section 110 of these specifications. The minimum shear to be used in designing the web members at any point in an open web steel joist shall be not less than fifty (50) percent of the required maximum end reaction for such steel joist. In computing the resistance of open web steel joists to loads incident to construction as described in Section 107 (c) of these specifications, the top chords shall satisfy the additional requirements that they shall safely carry the resulting compression using "*l*" as the distance between lines of bridging and "r" as the least radius of gyration of the top chord of any one steel joist around a vertical axis but the ratio of "*l*" to "r" in this case shall not exceed 200; however, the permissible stresses in pounds per square inch as established elsewhere in this Section 104 (a) may be increased by one-third. In no case shall the lines of bridging be spaced farther apart than that permitted in Section 108(b). No bending stresses shall be assumed in top chords of open web steel joists supporting poured concrete slabs which have a thickness of more than one-fourteenth (1/14) of the distance between supports under the top chords; but for open web steel joists supporting concrete slabs thinner than this, the theoretical bending stress for a uniform load shall be computed and subtracted from the allowable stress. In the design of open web nailer steel joists, the nailer strips shall not be assumed to carry any part of the stresses in the steel joists but, if adequate, may be assumed to carry the supported load to the panel points. When bending stresses in top chords of open web steel joists must be considered, the combined axial compression and bending stress at the center of the panel shall not exceed the permissible compression stress set forth above in this paragraph and at points of vertical support of the top chords shall not exceed eighteen thousand (18,000) pounds per square inch. The tensile stress shall not exceed eighteen thousand (18,000) pounds per square inch in any member.

(b) A solid web steel joist shall be designed as a beam. The maximum fiber stress in tension shall not exceed eighteen thousand (18,000) pounds per square inch. The maximum fiber stress in compression shall not exceed eighteen thousand (18,000) pounds per square inch nor

$$\frac{20{,}000}{1+\dfrac{l^2}{2000\,b^2}}$$

when the length "*l*" is the distance between lateral supports of the compression flange and "b" is the width of the compression flange. The greatest average shear in pounds per square inch on the gross area of the web shall not exceed 12,000 nor

$$\frac{18{,}000}{1+\dfrac{h^2}{7200\ t^2}}$$

when "h" is the clear distance between flanges and "t" is the thickness of the web. When the web of a solid web steel joist is made of two or more sheets of metal, each sheet shall be considered as a separate member, each sheet carrying its share of the shear.

In the completed structure, the top flanges of solid web steel joists may be considered as being stayed laterally when the deck or top slab over the steel joists complies with the provisions of Section 110 of these specifications. In computing the resistance of solid web steel joists to loads incident to construction as described in Section 107 (c) of these specifications, the top flanges shall satisfy the additional requirements that they shall safely carry the resulting compression, using "*l*" as the distance between lines of bridging and "b" as the width of the compression flange, but the ratio of "*l*" to "b" shall not exceed 40; however, the permissible stresses in pounds per square inch as established elsewhere in this Section 104 (b) may be increased by one-third. In no case shall the lines of bridging be spaced farther apart than that permitted in Section 108 (b). In the design of solid web nailer steel joists the nailer strips shall not be assumed to carry any part of the stresses in the steel joists.

(c) When a wood sleeper (nailing screed) is embedded in a top slab of poured concrete not less than two (2″) inches thick and as specified in Section 104 (a), bending stresses in the top chord of an open web steel joist need not be considered, provided the wood sleeper (nailing screed) is elevated a minimum of one (1″) inch above the top chord of the steel joist. In the case of an open web nailer steel joist, bending stresses in the top chord need not be considered, provided a wood nailer strip adequate to carry the supported load to the panel points is attached to the top chord in accordance with the provisions of Section

) of these specifications. When precast interlocking slabs are used over open web steel joists and are of sufficient width and rigidity to transmit a uniform floor or roof load to the panel points without the assistance of the top chords between panel points, bending stresses in the top chords need not be considered.

Section 105. SPAN:

(a) The span of steel joists shall not exceed twenty-four (24) times the depth of the steel portion of the steel joist.

(b) The span of open web steel joists shall not exceed five hundred fifty (550) times the least radius of gyration of the top chord around a vertical axis, but in case the top chord consists of a flat top section continuous with a center web, the radius of gyration of the top plate alone shall be taken.

Section 106. SPACING:

The spacing of steel joists in "Steel Joist Construction" shall be in compliance with the provisions of Section 100 (b) herein. In other than "Steel Joist Construction", steel joists may be used, in accordance with the provisions of Section 113 of these specifications, at spacings greater than that permitted by Section 100 (b) herein, to support wood or steel roof decks.

Section 107. ERECTION:

(a) The ends of steel joists shall extend a distance of at least four (4″) inches onto masonry or reinforced concrete supports and at least two-and-one-half (2½″) inches on steel supports. Every third steel joist on concrete or masonry supports shall be anchored thereto with an anchor equivalent to a three-eighths (⅜″) inch round. The ends of all steel joists supported on masonry walls shall be bedded in mortar. All steel joists supported on steel beams shall be secured thereto with an anchor made of not less than a three-sixteenths (3/16″) inch bar fastened over the flanges of the supporting beams, except in the case of buildings having a height of more than twice the least dimension of the base, in which case each steel joist shall be welded to the supporting steel work with two (2) welds at each end, each one (1″) inch long, or by means of a one-half (½″) inch bolt or rivet at each end. In the case of buildings having a height of more than two and one-half times the width of the base, the structural frame and floors must be depended upon to distribute the wind load horizontally. In general, welded or bolted attachment of steel joists to supporting beams as well as thicker top slabs than used in buildings of lesser heights may be advisable. At all supports where the steel joists are anchored with a hook anchor only, and in buildings having a height of more than two (2) times the width, the top lath or other centering shall be cut and formed to permit concrete of top slab to fill space around the ends of the steel joists.

(b) All steel joists shall be fastened in place and permanent bridging installed before any construction loads (except the weight of the necessary workmen to install the bridging) are placed upon the steel joists.

(c) During the construction period, care shall be exercised to prevent excessive concentrated or moving loads. The construction contractor shall provide for adequate distribution of such loads so that the carrying capacity of any steel joist is not exceeded during that period. When erected and bridged, the total concentrated load on any one steel joist shall not exceed eight hundred (800) pounds and in the case of open web steel joists, such concentrated load shall not be imposed between panel points.

Section 108. BRIDGING:

(a) As soon as steel joists have been erected, bridging shall be installed between them before the application of construction loads. This bridging shall be adequate to safely support the top chords or flanges against lateral movement during the construction period and shall hold the steel joists in an approximately vertical plane passing through the bearings. The steel joists at the ends of panels shall be braced laterally by anchors or ties at each line of bridging. If diagonal bridging is used in which all diagonal members will resist only tension, they shall not be less than a three-sixteenths (3/16″) inch round rod, and these diagonals shall be supplemented by a continuous strut adequately attached to the top chords or flanges of all steel joists so bridged. This top strut shall be equivalent as a strut to a one-half (½″) inch round steel bar. If diagonal members are used which are capable of resisting both tension and compression, the top strut may be omitted. In case bridging in the form of horizontally placed beam or angle sections is provided, it must be so connected to the steel joists that it will support the top chords or flanges agains lateral movement and hold the steel joists approximately in a vertical plane. Fourteen (14) gauge wire diagonals shall be used to secure the bottom chords or flanges at each line of bridging of this type. Wire may be omitted when bridging which restrains both top and bottom chords or flanges is used. When the spacing of steel joists exceeds thirty (30″) inches on centers in roofs, sag rods may be used in lieu of any of the above types of bridging.

(b) The number of lines of bridging provided shall be not less than that specified in the following table:

Span	Number of Lines of Bridging
Up to 14 feet	one row, near center
14 to 21 feet	two rows approximately ¼ span apart
21 to 32 feet	three rows

(c) In the case of nailer steel joists carrying a wood deck, the wood deck may be used as the top member of the bridging system.

Section 109. USES OF STEEL JOIST CONSTRUCTION

(a) When used in any structure where wood joists are permitted, steel joists may have a wood nailing strip attached to the top chord or flange and a wood floor may be used over such steel joists.

(b) Wherever constructions having a one-hour fire resistance are required or permitted, Steel Joist Construction may be used as follows:

One Hour Fire Resistance: Steel Joist Construction with 2 in. thick top slab of cast-in-place or precast metal-reinforced Portland cement or gypsum concrete with ceiling protection of not less than three-quarter (¾″) inch thick gypsum or Portland cement plaster on metal or paper-backed metal lath, the thickness of plaster being measured from the back of the lath. Gypsum plaster is to be not leaner than 1:2 by weight of cementing materials and dry sand for the scratch coat and not leaner than 1:3 for the brown coat. Portland cement plaster is to be not leaner than 1:3 by volume of cementing materials and dry sand. In such Portland cement plaster, hydrated lime may be added in an amount not to exceed 10% of the Portland cement by weight. Wood or metal nailing strips or screeds for attachment of wood flooring shall have not less than 1 in. of concrete between them and the top of the steel joists. They may be supported on metal chairs attached to the steel joists. Precast slabs must have joints grouted and be finished over with a coating of mortar or otherwise designed and constructed to assure tight end and side joints.

(c) Wherever constructions having a one-and-one-half-hour fire resistance are required or permitted, Steel Joist Construction may be used as follows:

One-and-One-Half-Hour Fire Resistance: Steel Joist Construction with 2 in. thick top slab of cast-in-place or precast metal-reinforced Portland cement or gypsum concrete with ceiling protection of not less than three-quarter (¾″) inch thick gypsum or Portland cement plaster on metal or paper-backed metal lath, the thickness of plaster being measured from the back of the lath. Gypsum plaster is to be not leaner than 1:2 by weight of cementing materials and dry sand for the scratch coat and not leaner than 1:3 for the brown coat. Portland cement plaster is to be not leaner than 1:3 by volume of cementing materials and dry sand. In such Portland cement plaster, hydrated lime may be added in an amount not to exceed 10% of the Portland cement by weight and short fibered (refiberized) asbestos shall be added in an amount from 2% to 3% of the Portland cement by weight. Wood or metal nailing strips or screeds for attachment of wood flooring shall have not less than 1 in. of concrete between them and top of the steel joists. They may be supported on metal chairs attached to the steel joists. Precast slabs must have joints grouted and be finished over with a coating of mortar or otherwise designed and constructed to assure tight end and side joints.

(d) Wherever constructions having a two-hour fire resistance are required or permitted, Steel Joist Construction may be used as follows:

Two-Hour Fire Resistance: Steel Joist Construction with top slab of cast-in-place metal-reinforced Portland cement or gypsum concrete not less than 2 in. thick over the top of the joists, or with 2 in. thick top slab of precast metal-reinforced gypsum concrete with ceiling protection of gypsum plaster on metal or paper-backed metal lath, plaster not leaner than 1:2 by weight of plaster and dry sand for the scratch coat and 1:3 for the brown coat, thickness to be not less than three-quarter (¾″) inch as measured from the back of the lath. Any wood or metal nailing strips must be underlaid with concrete carefully packed under them to a thickness not less than 1⅛ in. over the top of the steel joists. Precast slabs must have joints grouted and be finished over with a coating of mortar. In lieu of grouted joints, they must be designed and constructed to assure tight end and side joints.

(e) Wherever constructions having a three-hour fire resistance are required or permitted, Steel Joist Construction may be used as follows:

Three-Hour Fire Resistance: Steel Joist Construction with top slab of cast-in-place metal-reinforced Portland cement or gypsum concrete not less than 2½ in. thick over the top of the joists with ceiling protection of gypsum plaster on metal or paper-backed metal lath. Plaster is to be not less than one (1″) thick if neat gypsum plaster is used to which may be added sisal fiber, wood fiber, or asbestos fiber to increase workability. Plaster is to be not less than three-quarter (¾″) inch thick if neat gypsum plaster and the expanded vermiculite proportioned in the range 2:1 to 3:1 gypsum to heat-expanded vermiculite by weight is used. In each case the thickness of plaster is measured from the back of the lath. Any wood or metal nailing strips must be underlaid with concrete carefully packed under them and not less than 1⅝ in. thick above the top of steel joists.

(f) Wherever constructions having a four-hour fire resistance are required or permitted, Steel Joist Construction as described in either of the two subsequent sub-paragraphs of this Paragraph (f) may be used as follows:

Four-Hour Fire Resistance: Steel Joist Construction with top slab of cast-in-place metal-reinforced Portland cement or gypsum concrete not less than 2½ in. thick over the top of the joists with ceiling protection of not less than one (1″) inch thick gypsum-vermiculite plaster applied on metal lath and proportioned in the range 2:1 to 3:1 gypsum to heat-expanded vermiculite by weight, the thickness of plaster being measured from the back of the lath. There must be no wood or metal connection between p of the steel joists and any wood or metal nailing s, these latter to be underlaid with not less than 1⅝ in. concrete over the top of the steel joists.

Four-Hour Fire Resistance: Steel Joist Construction with 2 in. thick top slab of cast-in-place or precast metal-reinforced Portland cement or gypsum concrete with ceiling protection of metal-reinforced gypsum slabs 2 in. thick covered with not less than ½ in. of 1:2 sanded gypsum plaster. Wood or metal nailing strips or screeds for attachment of wood flooring shall have not less than 1⅛ inch of concrete between them and the top of the steel joists. They may be supported on metal chairs attached to the steel joists. Precast slabs must have joints grouted and be finished over with a coat of mortar or otherwise designed and constructed to assure tight end and side joints. In lieu of grouted joints they must be designed and constructed to assure tight end and side joints.

(g) Steel joists may be used in all buildings of human occupancy. Steel joists may be used in buildings of store, manufacturing, storage or warehouse occupancy; but where such buildings are subjected to unusual concentrated or moving loads, the required live load shall be not to exceed 125 pounds per square foot and the top slab shall be designed to adequately support and distribute such loads and adequate lateral support shall be provided to steel joists to support them against lateral loads.

Section 110. DECKS AND TOP SLABS:

(a) Decks or top slabs over steel joists may be of concrete or gypsum poured on metal lath centering attached to the top chords or flanges of steel joists as required elsewhere in this section or on removable centering provided the top chords or flanges of the steel joists are properly stayed by the concrete or gypsum slab. Other equally suitable permanent centering may be used, provided it is substantially attached to the top chords or flanges as required elsewhere in this section and provided these attachments (or the centering itself) are securely anchored into the concrete or gypsum slab. Precast concrete or precast gypsum slabs when securely attached to the top chords or flanges and anchored thereto and brought to a firm bearing, wood decks as specified in these specifications, and corrugated or other steel roof decks securely anchored to the top chords or flanges may be used over steel joists. Any attachment or pair of attachments when applied shall be capable of staying the top chord or flange laterally in both directions and in the case of open web steel joists, shall be spaced not farther apart than the panel point spacing. Decks or top slabs over steel joists shall not be assumed to carry any part of the compression stress in the steel joist.

(b) Flat wood decks of single thickness of seven-eighths (⅞″) inch material shall not have a span of more than twenty (20″) inches for floors, or thirty (30″) inches for roofs. All such decks shall be securely fastened to the wood nailer strips.

(c) Poured structural slabs of concrete, gypsum or other similar material shall not be less than two (2″) inches thick. They shall be poured upon three-eighths (⅜″) inch ribbed metal lath weighing not less than four (4) pounds per square yard for spans not exceeding 24 inches and upon three-quarter (¾″) inch rib lath weighing not less than .50 pounds per square foot for spans not exceeding 30 inches. Other material equally suitable as a form or centering for casting concrete or gypsum slabs may be used in place of rib lath. Rib lath or other centering which remains in place shall be substantially attached to the top chord or flange of each steel joist at intervals of not over eight (8″) inches. Such slabs shall be reinforced with mesh or rods, in addition to their rib lath, except that when slabs are to be covered with a wood strip top floor, the rib lath or centering may, if adequate, serve also as the reinforcement.

(d) Any material used as centering for the top slab shall be installed so as not to exert an undue lateral pull on the top chords or flanges of the steel joists.

Section 111. DEFLECTION:

The deflection of the finished floor due to the designed live load shall not exceed one three hundred sixtieth (1/360) of the span. The permanent deflection resulting from loading a finished floor to twice the designed live load for twelve (12) hours shall not exceed twenty (20%) percent of the total deflection for this load.

Section 112. FACTOR OF SAFETY:

The maximum total uniform load at failure of a steel joist floor shall not be less than two (2) times the total designed load of steel joists as computed by using the stresses permitted herein. Steel Joist Construction, if required to be tested, shall have bridging and top deck applied as ordinarily used and the test load shall be uniformly distributed.

Section 113. WOOD AND STEEL ROOF DECKS:

Where wood or steel decks are used for roof construction, steel joists may be used at spacings in excess of the limitations prescribed in Section 100(b) of these specifications. However, where such wider spacings are used, the construction shall not be considered as "Steel Joist Construction" as defined in these specifications but shall be designed and constructed in accordance with recognized engineering practice to safely support all loads without exceeding the unit stresses specified in these specifications herein.

TRUSCON "O-T" NAILER JOIST CONSTRUCTION

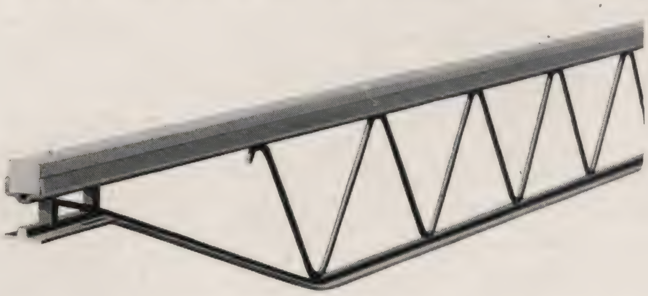
(Manufacture of this Nailer Joist is delayed due to difficulties in securing proper Nailing Strip.)

Truscon Open Truss Nailer Joists provide all the advantages of permanent floor construction for homes, apartments and other light occupancy buildings at a cost comparable with ordinary floors.

In them are incorporated the basic features of Truscon "O-T" Open Truss Steel Joists, so extensively used in important buildings throughout the country. Unusual strength and rigidity result from their superior design and construction. Easy installation follows a complete and accurate fabrication in the Truscon plant.

Wide, specially formed members for top and bottom chords impart stiffness to the Nailer Joists and keep them true to line. The continuous steel web member of uniform diameter throughout its entire length, is securely welded to the chords by means of high pressure electric automatic welding.

The end construction—a vital point in steel joist design—is unusually strong and rigid. Bearings for the joists are wide and ample. The underslung design of the supports not only insures stability of the joists during installation but provides additional head room under the supporting girders.



Their open web permits the passage of pipes and conduits in any direction through the floor construction without requiring cutting of joists or a suspended ceiling. Steel Joists eliminate the settlement due to wood shrinkage and consequent separation of baseboard and floor, and its tendency to cause plaster cracking.

ADVANTAGES OF NAILER JOISTS

Truscon "O-T" Open Truss Nailer Joists reach the job ready for placing without cutting or fitting. The wood flooring is nailed directly to the wood nailing strips which are securely attached to the top chords of the joists.

The light weight of nailer joist construction lessens the time and labor required for erection and also saves materials in the supporting framework and foundations. Every detail of joists and attachments has been perfected by practical experience to simplify installation and assure dependable results.

With a metal lath plastered ceiling attached to the lower chord of the joists, the construction provides fire-safety to a substantial degree, preventing the spread of fire from below.

With Truscon "O-T" Open Truss Nailer Joists available it is no longer necessary, from either a practical or economical standpoint, to use wood joist construction in any building.

TOTAL UNIFORM SAFE LOAD TABLE

The following table gives the total safe uniformly-distributed load-carrying capacities in pounds per lineal foot of span.

	Nominal Depth of Steel Portion only	8"	10"	12"		14"	16"
	Joist Types	80W	100W	120W	121W	141W	161W
	Estimated Weight in lbs. per foot	4.25	4.25	4.25	6.60	6.60	6.60
	Maximum End Reaction in lbs.	1550	1900	2000	2300	2300	3100
CLEAR OPENING OR NET SPAN	8'-0"	388					
	9'-0"	344					
	10'-0"	310					
	11'-0"	256					
	12'-0"	215	259	333			
	13'-0"	183	221	288			
	14'-0"	158	190	248	329		
	15'-0"	138	166	216	307		
	16'-0"	121	146	190	288		
	17'-0"		129	168	271	271	
	18'-0"		115	150	247	296	305
	19'-0"		103	135	222	242	273
	20'-0"		93	122	200	228	247
	21'-0"			110	181	207	224
	22'-0"			101	165	189	204
	23'-0"			92	151	173	187
	24'-0"			85	139	159	171
	25'-0"					146	158
	26'-0"					135	146
	27'-0"					125	135
	28'-0"					117	126
	29'-0"						117
	30'-0"						110
	31'-0"						103
	32'-0"						96

For floor construction nailer joists should not be spaced over 18 inches o. c.

SPECIFICATIONS

General—Where Nailer Joist floor construction is specified, it is understood to mean Truscon "O-T" Open Truss Nailer Joists of the size and spacing as shown on the drawings, together with a wooden floor over the joists and, unless otherwise specified, a metal lath and plaster ceiling directly beneath the joists.

The Nailer Joists shall be made of rolled steel shapes fabricated by high pressure electric automatic welding. The web member shall be a continuous plain round bar of constant diameter bent cold. The top chord shall be straight and the bottom chord bent up to form the bearing. The design and details of all members shall meet the requirements of the Steel Joist Institute Specifications. The wood nailer strip shall not be considered in determining the carrying capacity of the joist.

Nailer Strip—The wood nailer strip shall be treated with a moisture-proofing solution to prevent its absorption of moisture. It shall be held securely on top of the top chord by pressure embedment of the flanges of the top chord into its sides.

Painting—All Nailer Joists shall be spray or dip painted with one shop coat of good black asphalt metal protective paint.

Bearing and Anchorage—The ends of joists shall extend a distance of at least four (4") in. on masonry or reinforced concrete supports and at least two and one-half (2½") in. on steel supports. Every third joist bearing on masonry walls shall be anchored. Joists parallel to walls shall have the bottom chords anchored at the line of the rows of bridging. Every joist bearing on structural steel beams shall be fastened by an anchor (or welding).

Bridging— As soon as joists have been erected and before the application of construction loads, joists shall be bridged with a tension type of "underchord" rod bridging consisting of a ½ in. rod placed underneath the top chords of the joists and transversely to them and held in place by means of spring clips engaging the rod and the web members at a panel point. This transverse rod shall be supplemented by 3/16 in. diagonally placed rods securely wound to both the transversely placed rod and the web members where they meet the bottom chords of joists. For residential construction diagonal steel type bridging, welded to the top and bottom chord members of the joists, is recommended. For spans up to 14 ft. 0 in. one row of bridging is required; two rows between 14 ft. 0 in. and 21 ft. 0 in.; and three rows over 21 ft. 0 in.

Ceilings—Where directly attached ceiling occurs, Ceiling Extensions shall be provided.

Note: The spacing of the Nailer Joists must not be more than the safe span of the flooring over the joists.

TRUSCON "CLERESPAN" STEEL JOISTS

Truscon "Clerespan" Joists when employed in floor construction can be used advantageously in buildings for all types of occupancy regardless of their location. In many types of buildings their use will automatically eliminate all columns from the structure with the exception of those in the outer walls. Greater floor areas are thus provided without obstructing columns than has heretofore been accomplished. When used in roof construction "Clerespan" Joists meet all requirements of every type of building.

"Clerespan" Joists, made of hot rolled structural steel shapes, are designed in accordance with standard engineering practice. Top chords are designed for bending between panel points as well as for direct compression.

"Clerespan" Joists all have a camber built in them. They are fabricated by welding in a modern shop noted for its welding equipment and developments in automatic welding.

"Clerespan" Joists possess unusual lateral stiffness. This is due to the high radius of gyration about the vertical axis.

"Clerespan" accessories, such as anchors, lath clips, screed clips, bearing plates, etc., are similar to those used with open truss joists. Diagonal bracing or bridging is provided by hot-rolled angles. Lines of bracing are about 10 ft. apart.

NOTES REGARDING TABLE

The weight of dead loads must in all cases be deducted to determine the live load-carrying capacities which must be reduced for concentrated loads.

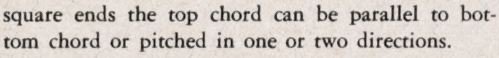
When holes are required in top or bottom chords the carrying capacities must be reduced in proportion to reduction of chord areas.

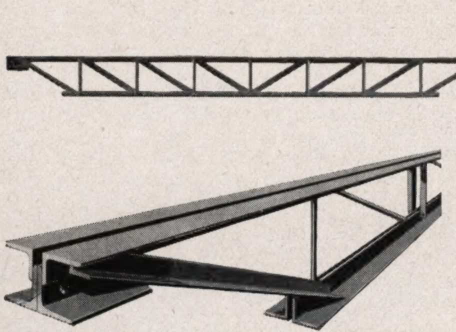
Figures printed in columns to right of heavy vertical line are for roof construction only.

Loads below horizontal zig-zag line are limited by end reaction.

Illustrations below show "Underslung" Clerespan with top chord parallel to bottom. However, they can also be made with square ends, and with square ends the top chord can be parallel to bottom chord or pitched in one or two directions.

The carrying capacities of "Clerespan" with top chords pitched, is determined by the nominal depth of the "Clerespan" Joists at the center of the span.





TOTAL SAFE UNIFORM LOAD TABLE

The following table gives the total safe uniformly-distributed load-carrying capacities of Truscon "Clerespan" Joists in pounds per lineal foot of span.

	Joist Types	Weight Lbs./Ft.	Max. End Reaction	Clear Opening or Net Span											
				25'-0"	26'-0"	27'-0"	28'-0"	29'-0"	30'-0"	31'-0"	32'-0"	33'-0"	34'-0"	35'-0"	36'-0"
18" Depths	181	11	3,775	302	285	269	252	236	221	208	196	184	174	165	156
	182	12	4,213	337	320	298	277	259	242	226	212	200	188	178	168
	183	13	4,700	376	356	337	319	302	283	265	248	234	220	208	196
	184	15	5,625	450	422	392	364	340	317	297	278	262	247	233	220
	185	17	6,113	489	462	437	414	392	366	343	322	303	285	269	254
	186	19	6,966	557	536	516	480	448	418	392	368	346	326	307	291
	187	21	7,279	582	560	539	520	502	470	442	415	391	369	349	330
	188	23	7,635	611	587	566	545	527	509	478	449	423	399	377	357
	189	25	8,144	650	626	603	582	561	542	525	509	479	452	426	404
	1810	27	8,531	682	656	632	609	588	568	550	533	517	487	460	434
	1811	29	8,768	701	674	649	626	605	584	566	548	531	516	501	473
	1812	32	9,288	743	714	688	663	640	619	598	580	563	546	531	516
				29'-0"	30'-0"	31'-0"	32'-0"	33'-0"	34'-0"	35'-0"	36'-0"	37'-0"	38'-0"	39'-0"	40'-0"
20" Depths	201	11	3,625	250	238	226	215	203	192	182	172	163	155	148	141
	202	12	4,031	278	267	253	237	223	210	198	187	177	168	160	152
	203	13	4,510	311	296	282	269	257	246	232	219	208	197	187	178
	204	15	5,409	373	354	332	312	293	276	261	246	233	221	210	199
	205	17	5,858	404	385	367	350	334	319	301	284	269	255	242	230
	206	19	7,091	489	464	439	412	387	355	344	325	308	292	277	264
	207	21	7,560	521	504	479	456	433	409	387	366	347	330	314	299
	208	23	7,984	550	532	515	499	471	444	420	398	377	358	340	324
	209	25	8,517	587	568	549	532	516	501	474	449	426	404	385	366
	2010	27	8,995	619	598	580	562	544	528	514	487	462	438	416	395
	2011	29	9,306	642	620	600	582	564	547	532	517	503	477	453	431
	2012	32	9,880	681	658	637	617	598	581	564	549	534	520	493	469
	2013	34	10,023	691	668	647	626	607	590	573	557	542	528	514	489
	2014	36	10,660	735	710	688	663	646	627	608	592	576	561	547	533
				33'-0"	34'-0"	35'-0"	36'-0"	37'-0"	38'-0"	39'-0"	40'-0"	41'-0"	42'-0"	43'-0"	44'-0"
22" Depths	221	11	3,498	212	203	194	186	178	169	161	154	147	140	134	128
	222	12	3,911	237	227	218	207	196	186	176	168	160	152	145	139
	223	13	4,340	263	252	242	232	223	214	206	196	187	178	170	162
	224	15	5,214	316	302	288	273	258	245	233	221	210	200	191	183
	225	17	5,643	342	328	315	302	290	279	268	255	242	231	220	210
	226	19	6,848	415	396	379	360	341	323	307	292	278	265	252	241
	227	21	7,442	451	431	412	394	378	361	344	327	312	298	283	272
	228	23	8,481	514	486	460	436	414	393	374	356	340	324	310	296
	229	25	8,855	537	521	506	484	464	443	421	401	383	365	349	334
	2210	27	9,380	568	552	536	521	507	481	458	436	416	397	379	362
	2211	29	9,750	590	574	557	542	527	513	500	476	454	433	413	395
	2212	32	10,360	628	609	592	575	560	545	531	518	494	471	450	429
	2213	34	10,558	640	621	603	587	571	556	541	528	515	491	468	447
	2214	36	10,987	666	646	625	610	594	578	563	549	536	523	511	488
				37'-0"	38'-0"	39'-0"	40'-0"	41'-0"	42'-0"	43'-0"	44'-0"	45'-0"	46'-0"	47'-0"	48'-0"
24" Depths	242	12	3,774	204	197	190	183	175	167	159	152	145	139	133	128
	243	13	4,200	227	219	211	203	196	189	183	176	170	162	156	149
	244	15	5,069	274	263	253	242	233	220	209	200	191	183	176	168
	245	17	5,458	295	284	274	264	255	246	238	229	220	211	202	194
	246	19	6,642	359	345	331	318	305	290	277	264	253	242	232	222
	247	21	7,215	390	374	360	346	333	321	309	296	283	271	260	250
	248	23	8,288	448	427	406	387	369	353	337	322	309	296	284	272
	249	25	8,862	479	460	442	426	409	394	379	363	347	333	320	307
	2410	27	9,937	537	523	498	475	453	432	413	395	378	363	348	334
	2411	29	10,360	560	545	531	518	494	471	450	431	413	395	379	364
	2412	32	10,773	582	567	552	539	526	513	490	469	449	430	413	396
	2413	34	11,073	598	583	568	554	540	527	515	492	470	450	431	413
	2414	36	11,543	624	608	592	577	563	550	537	525	513	491	470	451
				41'-0"	42'-0"	43'-0"	44'-0"	45'-0"	46'-0"	47'-0	48'-0"	49'-0"	50'-0"	51'-0"	52'-0"
26" Depths	264	15	4,920	240	232	223	216	208	201	193	185	178	171	165	159
	265	17	5,310	259	250	242	234	227	220	213	206	199	191	184	178
	266	19	6,478	316	304	294	283	273	263	252	242	232	223	214	206
	267	21	7,011	342	330	319	308	297	287	278	269	259	249	240	231
	268	23	8,057	393	380	364	348	333	319	307	294	283	272	262	252
	269	25	8,631	421	406	392	378	365	353	342	330	318	306	295	284
	2610	27	9,984	487	466	445	426	408	392	376	361	347	334	321	309
	2611	29	10,563	514	503	484	465	445	427	410	393	378	364	350	337
	2612	32	11,000	537	524	512	500	483	465	446	428	411	396	381	367
	2613	34	11,543	563	550	537	525	513	491	470	451	432	415	399	384
	2614	36	12,032	587	573	560	547	535	523	512	491	471	452	435	418
				45'-0"	46'-0"	47'-0"	48'-0"	49'-0	50'-0"	51'-0"	52'-0"	53'-0"	54'-0"	55'-0"	56'-0"
28" Depths	284	15	4,815	214	207	200	194	187	182	175	169	162	156	151	145
	285	17	5,153	229	223	216	210	204	198	190	184	177	171	165	160
	286	19	6,323	281	272	263	254	247	239	232	223	214	206	199	192
	287	21	6,840	304	294	285	276	268	259	252	244	237	230	222	215
	288	23	7,875	350	338	326	315	303	292	281	271	261	252	243	235
	289	25	8,415	374	362	351	340	329	319	310	300	291	283	273	264
	2810	27	9,765	434	419	403	387	372	358	345	332	320	309	298	288
	2811	29	10,463	465	449	434	420	405	390	376	362	349	337	325	314
	2812	32	11,183	497	481	465	450	436	422	409	394	379	366	353	341
	2813	34	12,190	542	530	509	488	468	449	432	416	400	385	371	358
	2814	36	12,495	555	543	532	521	510	489	470	452	436	420	404	390
				49'-0"	50'-0"	51'-0"	52'-0"	53'-0"	54'-0"	55'-0"	56'-0"	57'-0"	58'-0"	59'-0"	60'-0"
30" Depths	304	15	4,704	192	187	181	176	171	166	161	156	151	145	140	136
	305	17	5,023	205	200	194	188	182	175	170	164	159	154	149	144
	306	19	6,174	252	245	237	231	224	218	211	206	199	192	186	180
	307	21	6,689	273	265	257	250	243	236	230	223	217	211	205	199
	308	23	7,718	315	305	296	287	278	269	259	250	242	234	227	219
	309	25	8,232	336	326	316	307	299	291	232	275	267	259	251	243
	3010	27	9,555	390	378	367	354	341	329	318	307	297	287	278	269
	3011	29	10,241	418	405	393	381	370	359	347	335	324	313	303	293
	3012	32	10,952	447	433	420	408	396	385	374	363	352	340	329	319
	3013	34	12,103	494	479	464	447	430	415	400	386	372	359	347	336
	3014	36	12,825	523	513	498	483	468	451	435	420	405	391	378	366
				53'-0"	54'-0"	55'-0"	56'-0"	57'-0"	58'-0"	59'-0"	60'-0"	61'-0"	62'-0"	63'-0"	64'-0"
32" Depths	328	23	7,553	285	277	270	263	255	249	241	233	226	219	212	206
	329	25	8,056	304	296	288	280	273	266	259	252	244	236	229	223
	3210	27	9.381	354	344	334	325	315	305	295	286	277	268	260	253
	3211	29	10,044	379	368	358	348	339	330	321	311	302	293	284	275
	3212	32	10,733	405	394	383	373	363	353	344	335	326	317	308	299
	3213	34	11,819	446	433	422	410	398	385	372	360	348	337	326	316
	3214	36	12,720	480	467	454	442	430	418	404	391	379	366	355	344

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